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WILD LIFE
IN THE WEST HIGHLANDS

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OTTER

WILD LIFE
IN THE
WEST HIGHLANDS

BY

CHARLES HENRY ALSTON

WITH ILLUSTRATIONS BY A. SCOTT RANKIN

GLASGOW

JAMES MACLEHOSE AND SONS

PUBLISHERS TO THE UNIVERSITY

1912

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TO

R. M. G. A.

IN MEMORY

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'And God saw every thing that He had made, and, behold, it was very good.'

PREFACE

THROUGHOUT a life spent much out of doors, I have endeavoured to cultivate the habit of observation, and now offer to my fellow-lovers of birds and beasts the following nature studies of Wild Life in the West Highlands.

As an appendix I have inserted two papers on the Elephant at home and on The Kea; and I am glad to be able to include in the latter paper, notes by an early New Zealand settler on the habits of this destructive bird.

I cordially acknowledge my obligations to the editor of the *Scotsman* for his kindness in permitting me to reprint such of these papers as appeared originally in its columns.

CHARLES HENRY ALSTON.

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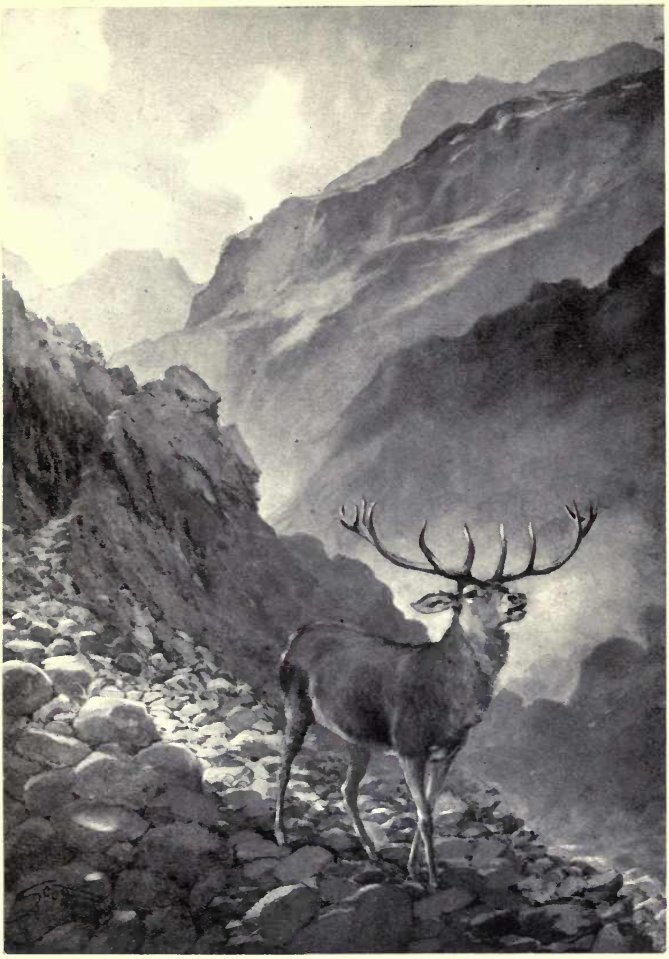


In the Sanctuary

THE WOLF IN SCOTLAND.

I.

THE WOLF IN SCOTLAND.

When Caesar and his legions first invaded Britain, and for ages previous to that event, by far the greater portion of these Islands was covered with dense forest, widely extending marshes, wild and inaccessible labyrinths of wood and mountain. In these dark fastnesses roamed the shaggy Bison, the long-horned Urus, the Bear, the mighty Elk, the wild Boar and the Wolf; the Reindeer wandered over our Northern mountains, and the Beaver built its dams and houses in our streams. All these are gone; but by far the latest to linger was the wolf.

As men multiplied and cultivation increased, the forests gradually disappeared, and the wolf was driven ever back to the wilder and remoter districts; hence he lingered longest in Ireland, and in the vast forests and uninhabited country of the Scottish Highlands.

Any account of the animals formerly inhabiting this country and long extinct must,

of necessity, be of the nature of a compilation, the material for which is diffuse, scattered and not accessible to everyone. The path of the student of to-day, however, has been made easier by the labours of those who have preceded him, chief among whom may be mentioned Mr. J. E. Harting, who, in his volume on *Extinct British Animals*, has gathered together in chronological order almost all that is to be found in history and tradition on the subject. To him I offer my grateful acknowledgment of indebtedness, as well as to Mr. J. A. Harvie-Brown for the information summarised in his well-known series of volumes on the *Vertebrate Fauna of Scotland*. I have also had the advantage of material left by my brother, the late Edward R. Alston, some of it hitherto unpublished.

In earlier days all England was ravaged by wolves. By the Saxons the month of January was termed 'Wolf Month,'[1] the stress of winter no doubt making them bolder and more dangerous. In Wales they were so numerous, that in order to encourage their destruction King Edgar caused part of the tribute of the King of Wales to take the form of 300 wolf-skins annually; and the story of Llewellyn,

[1] Harting, *Extinct British Animals*.

Prince of Wales in the time of King John, and his dog Gelert who saved the child from the wolf, is a household word to this day.

To come to Scotland, the historical notices, stories, and traditions as to wolves are so numerous that a few examples must suffice:

In 1427, in the reign of James I. of Scotland, an Act was passed for the destruction of wolves,[1] and there were many subsequent Acts for the same purpose. Among other things the law required: 'ilk baron sall chase and seek the quhelpes of wolves and gar slay them and sall give to the man that slays the Woolfe twa shillings.' In James II.'s time the reward is as follows: 'Whatsumever hee bee that slays ane Woolfe sall have sex pennyes.'[1] Lindsay, in *Chronicles of Scotland*, relates that in a hunt in 1528 in Atholl, provided for King James V. by the Earl of Atholl, 'Woulff, fox and wild Cattis' together with 'harts and hynds' were slain.

Again in 1563, in a hunt organised by the 4th Earl of Atholl for Queen Mary, when 2000 men were employed, 5 wolves, together with 360 deer, were among the spoils of the three days' chase.[1] Holinshed, in his *Scotland till 1571*, says that so dangerous were the wolves in the Highlands that it became necessary to

[1] Harting, *Extinct British Animals.*

erect refuges for the safety of travellers overtaken by night, which were termed 'Spittals,' hence probably 'Spittal of Glenshee' and other places similarly named.[1] Taylor, the Water Poet, travelling on foot through Scotland in 1618, says of the country traversed in going to Braemar, that for long he saw no animals but 'deer, wild horses, wolves, and such-like creatures.' Bellenden, in his translation of Hector Boece (1536), also notes 'wild hors' along with the 'Wolffis' in the Caledonian forests; and says of the wolves that they were 'rycht noysum to the tame bestial in all parts of Scotland.' Sir Robert Gordon,[2] says that the forests then were 'full of reid deer and roes, Woulffs, foxes, wyld catts, brocks, skyurells, whittrets, weasels, otters martrixes, hares and fumarts'; and in 1621 the reward paid in that county for killing a wolf was, by Statute, £6 13s. 4d.; 'Scots' no doubt.[1]

The exact date of the extinction of the wolf in Scotland is doubtful. The great forests which had covered so much of the country had dwindled almost to the vanishing point. The cause of this is an open question, as to which

[1] Harting, *Extinct British Animals.*

[2] *Genealogical History of the Earldom of Sutherland from its origin to the year 1630.*

opinions differ; but it seems that, to some extent at least, forests were destroyed for the purpose of exterminating the wolves. In Stuart's *Lays of the Deer Forest* it is told how Oliver Cromwell caused great areas of oak and fir woods in Lochaber to be burnt for this purpose; and the like measures were carried out in other localities.

Whether from considerable change of climate, as some think, or from whatever cause, the nature of the Caledonian forests appears to have become gradually much modified. Harvie-Brown and Buckley[1] have this note from the late Lord Tweedmouth, referring to trees at Strath Glass: 'Sir Roderick Murchison's theory was that the fir had succeeded the Oak tree here, that the birch would supplant the fir, and oak would follow the birch, not in our time but in the future.' Now we find singular confirmation of this theory in the picturesque wood which fringes Loch Tulla, immediately opposite Lord Breadalbane's beautiful shooting lodge at the Black Mount. This wood is marked on the map, and known in the district to this day as the 'Doire daraich'—the oak-grove; yet it consists of magnificent old twisted and gnarled Scots firs, with a little birch on the outskirts; but not a

[1] *Fauna of the Moray Basin.*

vestige of an oak, old or young, is to be seen. Whether any remains of ancient oaks have been brought to light in the course of wood-cutting, quarrying and other recent excavations there, I do not know; as to this it would be interesting to learn what the experience of the Estate Authorities has been.

Pennant cites the well-known case of Sir Ewen Cameron of Lochiel's wolf in 1680 as 'the last'; but though possibly true for Lochaber, it was by no means the last in Scotland. In 1818, at the sale by auction of the London Museum there is an entry in the catalogue: 'Wolf—a noble animal in a large glass case. The last wolf killed in Scotland by Sir E. Cameron.'[1]

Of traditions of 'last wolves' there are many; but one or two examples will suffice. In Sutherland, about 1690-1700, old wolves and cubs were said to have been killed in three different places, Assynt, Halladale, and Glen Loth. This last story is well known. A man named Polson, and his two sons, having found a wolf's den in a cairn, the two lads crept in and found a family of cubs which they proceeded to kill, the father of the lads remaining without. To his horror he perceived the furious mother

[1] Harting, *Extinct British Animals.*

rushing homeward, attracted by the cries of the cubs. As it dashed past him into the entrance of the cave, Polson luckily succeeded in seizing it by the tail and holding it fast, thus darkening the aperture, on which one of the sons asked what was keeping out the light. 'If the tail breaks you will soon know that,' said the father, who succeeded, however, in killing the animal with repeated stabs of his dirk. So Scrope in *Days of Deer-stalking*. The name Polson is evidently an English form of 'MacPhail.'

A very persistent popular tradition gives as the date of the absolute last of the many 'last wolves' the year 1743. The hero of the tale was one MacQueen of Poll-a'-Chrocain, and the locality, the Findhorn country near the Monadhliath range, then a wild and desolate district. The story is that a message was brought to MacQueen, a man of gigantic stature and noted for his courage and prowess as a hunter, that a 'large black beast' had killed two children, and requiring him to join his chief, the MacIntosh of that day, with his dogs for a great hunt on the following day. In the morning all were at the gathering place, except MacQueen, whose non-appearance greatly irritated the Chief; and when at last MacQueen made his appearance he was received with

impatience and remonstrance. 'What is the hurry?' said MacQueen, unfolding his plaid and throwing down the newly severed head of the wolf at the MacIntosh's feet. 'There it is for you'; and the tradition further tells how he was rewarded by his Chief with the grant of the lands of Seann-achan 'for meal to his dogs.'[1]

I am indebted to the Rev. A. S. Macinnes of Glencoe for the following account of how the tradition of the 'last wolf' ran among the Gaelic-speaking inhabitants of that district as recently as 1908.

'The local tradition is that the last was killed by Sir Ewen (Eoghan) Cameron of Lochiel at the north end of Loch Arkaig (Arcaig). The place is called Glac-a'-Mhadaidh (Wolf's Hollow). Glen Moriston also claims the honour. In this case the honour of dispatching the lonely one is given to a woman. She had been away with food to some of her people who were cutting peats or hay, and on the way home was met by the wolf. She wound the towel in which she had carried the food round her hand and thrust the knife which she had for cutting the meat or cheese into the brute's mouth. He attacked her open-mouthed, and

[1] Stuart, *Lays of the Deer-Forest.*

she thrust the knife down his throat, the towel shielding her hand from his teeth when he closed his jaws.'

The custom, so common in the Highlands, of interring the dead on islands is said, by constant tradition, to have prevailed in order that the graves should not be despoiled by the wolves. Such, for example, is the story of the graveyard in the island of Handa,[1] and of those on Innishail on Loch Awe, and on the island of St. Munda on Loch Leven, at Glencoe. With regard to the last, the writer once asked a native if he knew why an inconvenient island on a stormy loch was chosen for that purpose, his reply was that it was 'on account of the tigers.' He admitted, however, that the 'tiger' had never been indigenous in these parts, and that the wolf, 'Madadh-galla,'—as he called it —was doubtless meant. It was formerly the custom in Atholl to inter the dead in coffins formed of five flag-stones, for the same purpose.

'Madadh-allaidh,' wild hound, seems to be the correct Gaelic name for the wolf; in ordinary conversation usually 'Madadh-galla,' which appears to be merely a euphonic alteration. 'Faol' or 'Faol-chu,' with the same significa-

[1] Harvie-Brown, *Fauna of Sutherland, Caithness, and Cromarty.*

tion, is obsolete,[1] and 'Mac-tire,' Son of the Earth, is, of course, poetical.

The wolf has left his record in many place-names North and South. In the Lowlands those names compounded with 'wolf,' *e.g.* 'Wolf-cleugh' (several), 'Wolf-lee,' 'Wolf-hill' and many others, need no explanation. In Gaelic compound names, those ending in their English form in 'maddy' or 'vaddie' doubtless mean 'madadh,' and probably in most cases refer to the wolf; although 'Madadh' is also used for a hound or dog. Such as Craigmaddy, Ardmaddy, Toulvaddie, Sron-mhadaidh, Meall-a'-mhadaidh,—respectively the craig, the height, the hole, the nose or point, and the hill,—seem certainly to refer to the 'wild dog.' Names compounded with 'cu' (gen. pl. 'con') meaning simply 'dog,' may or may not refer to the wild animal; but there can be no doubt about 'Gleann-chon-fhiadh,' Glen of the wild dogs; and 'Caolas-nan-Con,' the narrows of the dogs, on the salt-water Loch Leven, may very well refer to wolves. Achna-cone (Achadh-nan-con) the field of dogs, is an example of the doubtful cases—unless, indeed, there is some tradition as to the origin of the name.

[1] MacBain.

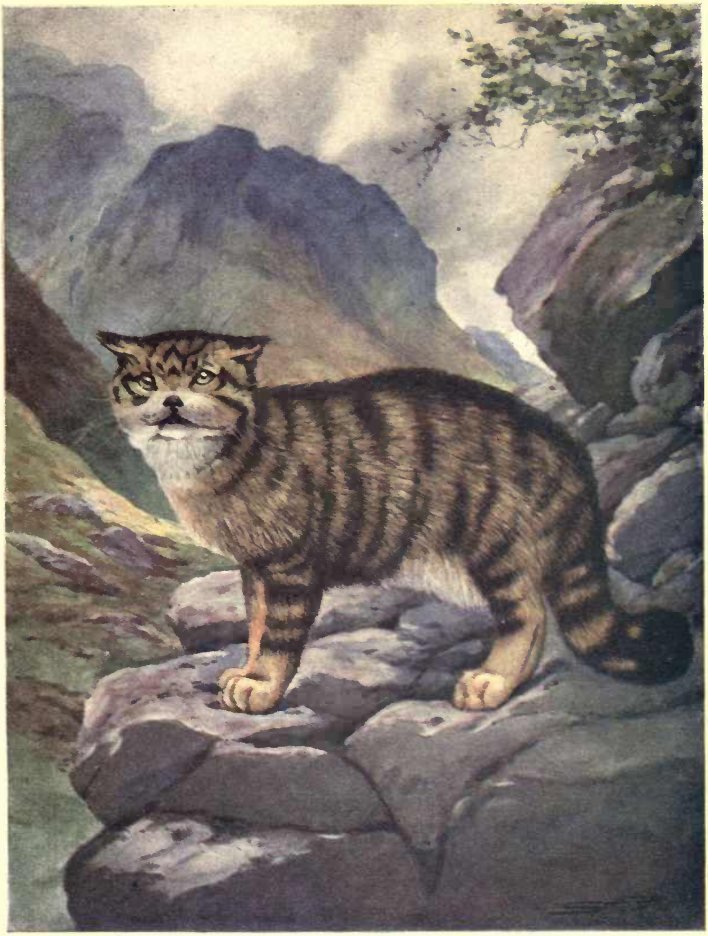
Doubtless wolves existed in Ireland also in great numbers; and the Irish wolf-hound, which was used in their pursuit, was considered to be of such value that two of them were sent to Queen Elizabeth as a gift by an Irish Chieftain, together with two horses and two hawks; and Sir Francis Walsingham also received in 1585 a 'brace of good wolf-dogs, one black and the other white,' from Sir John Perrott, the Lord-Deputy of Ireland.[1] There is the same story there of several 'last wolves,' and the same difficulty in fixing the date of final extinction. Harting sums up thus: 'So far as can now be ascertained, it appears that the wolf became extinct in England during the reign of Henry VII.; that it survived in Scotland until 1743; and that the last of these animals was killed in Ireland, according to Richardson, in 1770, or according to Sir James Emerson Tennent, subsequently to 1766.' But on Harting's own showing, these two latter dates for Ireland are extremely doubtful; and a safer date to assume for the final extinction of the race in Ireland is 1710, when 'the last presentment for killing wolves was made in the County of Cork.'

To most of us, a reference to 'Wolves in

[1] Harting, *Extinct British Animals.*

Scotland' naturally suggests some remote date; but, if the well-accredited tradition of MacQueen of Poll-a-Chrocain is accepted, there must be many now alive, whose parents in their youth may well have seen and spoken with the slayer of the 'Last wolf in Scotland.'

THE WILD CAT.



Wild Cat

II.

THE WILD CAT.

THE *Felidae*, or Cats proper, comprise the most numerous group of the family of Carnivora, and are to be found well-nigh all over the world excepting the Arctic regions and Australasia; but in Europe we have, with a solitary exception, only one indigenous species, the Wild Cat, formerly designated *Felis catus*, but according to the latest authorities better described scientifically as *F. sylvestris*; the Scottish having been recently further distinguished from the Continental form as *F. sylvestris grampia*. Only in Sardinia is an exception to be found, where a local representative of the Egyptian cat occurs, described as *F. ocreata sarda*. Singularly enough, the wild cat has never been found in Ireland.

This is, perhaps, the most interesting of the remaining feral inhabitants of our Scottish Highlands, to which it is to-day restricted, although at one time doubtless to be found

throughout Great Britain. In its immensely powerful muscular development, resembling in this its congeners the great cats of warmer climates, its untameable ferocity and love for the solitude of remote and inaccessible fastnesses, it recalls the days when the Caledonian forests held other and yet more powerful beasts of 'ravin.'

In the latter half of the last century there appeared to be much reason to believe that this species was rapidly approaching extinction. So bloodthirsty and formidable an animal had necessarily many enemies. Young red-deer calves, fawns of roe-deer, hares, rabbits, sickly lambs, game and other birds of every sort and their young—even domestic poultry—all were laid under tribute as occasion served. The rapid rise and increase of sheep farming throughout the Highlands, and the enhanced values of all sporting property brought about by the greater travelling facilities which served to make the waste places of Scotland more and more the play ground of the wealthy Southron, brought about many a change; and the wild cat suffered unremitting persecution along with the marten, the polecat, the eagles, the osprey and yet others of our northern fauna —some now extinct, some still hovering on the

verge. It was even maintained by some—and may possibly even yet be held—that the wild cat as a pure and unmixed species had already ceased to exist; that those still here and there to be found were no longer the legitimate descendants of the original indigenous species, but were only mongrels; the pure strain having been already lost by admixture with the straying domestic cat. To-day, however, those best informed maintain that absolutely pure-bred and undoubted descendants of our original wild cat still exist in Scotland, and that, too, in increasing numbers.

The wild cat was widely distributed over the middle and southern districts of Europe, although nowadays in many parts exterminated by the advance of population and agriculture, and therefore restricted to-day to the wilder and less accessible regions; and is, as already stated, with one exception, the sole representative of the cats proper native to this Continent. Beyond our own country it is to be found, if in ever-diminishing numbers, in France and Germany, Poland and Russia, throughout Southern Europe and Turkey to the Caucasus; but, it is believed, not to the east of the Urals. Singularly enough, it is quite unknown in Scandinavia; and this is

noticeable from the point of view of scientific nomenclature. As has been well pointed out by Mr. R. J. Pocock, Superintendent of the Zoological Society's Gardens, one of our best authorities on this species and its congeners, the specific name *catus* was given by Linnaeus, who must in doing so have meant the domestic cat, the only species which he knew, unless by hearsay ; and it is quite evident that he took it for granted that the wild and domestic cat were one and the same animal. Since his day most writers seem to have followed him in this. But here the large and doubtful question of the origin of our domestic cat at once meets us ; and this being admittedly unsettled, it seems that these modern writers are well advised who retain the designation *catus* for one of the house-cats to which Linnaeus first applied it, and accept *sylvestris* to distinguish the wild cat.

Linnaeus' description of the stripes of *catus* are not applicable to the wild cat, but is clearly that of the 'blotched' tabby form ; and this is a strong argument for the rejection of *catus* for the former.

It is certainly true that the wild and domestic cats stand in very close relationship. Blasius[1]

[1] *Naturgeschichte der Säugethiere Deutschlands*, 1857.

points out certain small differences in the skulls of the two forms by which they may be separated, if with difficulty; but the two races interbreed freely, and unquestionably mongrels may frequently occur. Those, however, who have made a study of the subject and are familiar with the true wild cat can hardly fail to distinguish at once the pure from those of mixed descent. Perhaps the most usual point of difference adverted to in discussion or writings on the subject is that of the tail, which is averred to be thicker at the tip than the more pointed tail of the house-cat; but this is really only a matter of hair, the skeleton of the tail being in both cases much alike, as far as taper is concerned. It has been pointed out by Mr. Pocock that there is an exact parallel in the case of the tigers of India and Mongolia respectively; where in the short-haired Indian tiger the tail is tapered, but in the long-haired northern individual is thick at the point,—just as in the wild cat and for the same reason, the greater length and thickness of the hair covering it. An analogous instance occurs in the case of the extraordinarily thick fur of the cats kept in the Pittsburg refrigerators and on the Island of St. Paul,—as compared with the opposite extreme of shortness of hair in the cats of

East Africa. It seems to follow that length or thickness of fur cannot be held to be of much value in a question of systematic discrimination.

In the patterns, however, shown in the stripes or spots and blotches, to be found on all cats not self-coloured, careful investigation has proved that these are found to be, in practically all cases, divisible into two categories, the 'striped' and the 'blotched'; and it is by continuing his investigations on these lines that Mr. Pocock comes to the conclusions which are to be found in his interesting paper in the *Proceedings of the Zoological Society*, 1907. In comparing the European wild cat (*sylvestris*) and the Egyptian (*ocreata*) the resemblances are so many and the distinctions so few that it seems to be questionable whether they can be held to be other than types of the same species differentiated, in some degree, by varying climate and other surroundings; and it is also to be remembered that their natural areas meet, so that the two may well have interbred. It is impossible here to reproduce all the arguments and deductions—many of them new, and all of them as interesting as able,—to be found in Mr. Pocock's paper; but the result arrived at in the question of the origin of the domestic cat may probably be fairly summarised to this effect, viz. that it is

impossible to decide positively; but the striped form so clearly resembles both the African and European wild cat that in all probability these are, in greater or lesser proportion, the progenitors of this form; while the blotched type cannot be so accounted for; and its origin, for the present at least, must remain undecided.

To return to the wild cat in our own land, we have proof of its former wider distribution in the number of place-names associated with it, not in the Highlands only but also in the Lowlands. In a *Fauna of Scotland*, 1880, by the late E. R. Alston, F.L.S., it is stated: 'Once generally distributed all over the mainland, the Wild Cat has been totally extirpated in the Lowlands and in many parts of the Highlands. It is still to be found, however, in the wilder districts of most of the Northern Counties, especially in the deer-forests, where it is left comparatively undisturbed. Till of late years its Southern outpost was the mountainous country around Loch Lomond, whence there are specimens in the Glasgow University Museum, but it is now extinct in that neighbourhood, and I believe that none now exist south of the Northern districts of Argyll and Perthshire. There appears to be no evidence that the wild cat was ever found in any of the

Islands, Pennant's statement that it was a native of Arran being probably erroneous.'

To-day the localities where it is still to be found are rather to be described as the western and north-western districts of the Highlands. The principal area of distribution extends from Northern Argyll through Moydart and Knoydart up to Northern Inverness-shire, in all suitable localities west of the Caledonian Canal and in the vicinity of the Canal itself. Steep craggy hill-sides, deep gloomy glens shaggy with tall heather and bracken, natural fir and birch-woods strewn with cairns, fallen boulders and ancient tree-trunks,—such are the places where they take up their abode; and so retiring and nocturnal are they in their habits that were it not for tell-tale traces in the winter snow, often for long they would remain unsuspected.

The wild cat has been known to breed in confinement. In *Fauna of the North-West Highlands and Skye*, Mr. J. A. Harvie-Brown gives this extract from a letter from Mr. Alfred Heneage Cocks, dated January 29th, 1887: 'A kitten of the true Wild Cat, a female, about 2½ months old, was sent to me from Kinlochewe, W. Ross-shire, on July 28th, arriving here, Great Marlow, Bucks, on 31st, 1873, and it bred four years with a male from Inverness;

July 13th, 1875, 3; May 21st, 1876, 2; May 29th, 1877, 3; May 23rd, 1878, 2 kittens. Gestation was 68 days, and the kittens at birth about double the size of tame ones.' Mr. Pocock has kindly sent to the writer an account of the breeding in the Zoological Society's Gardens, London, of a male Scottish wild cat with an Egyptian cat (*Felis ocreata*). Particulars of this interesting experiment were given, with excellent photographs, in the *Proceedings of the Zoological Society*, 1907. The striking configuration of the markings of the surviving kitten 'confirmed Mr. Pocock's opinion that the striped-tabby Domestic Cat of Europe was descended from the European and African Wild Cats (*Felis sylvestris* and *Felis ocreata*).'

That our wild cat will interbreed with the domestic cat has always been taken for granted, but is a positively ascertained fact; as one gentleman at least, Mr. A. H. Cocks, has succeeded several times in obtaining the cross.

In proof that the wild cat is, up to the present day at least, by no means so near extinction as has sometimes been assumed, it may be noted that living specimens are offered to the Zoological Society every winter; and within a few weeks in 1909 no less than

three were reported as killed in one West Highland district; the latest is said to have measured 40 inches in length, and to have weighed 14 lbs. Bell[1] gives the length of the average male as being: head and body, 1 foot 10 inches, tail fully 11 inches—total, 33 inches; but states that the dimensions vary greatly in individuals, as might be expected. The female is the smaller of the two.

It would be a sad loss to our Scottish fauna if this animal, in many respects the most interesting of our remaining wild inhabitants, were to be exterminated; and should those in a position to afford protection to it in its few remaining haunts neglect to do so, it is all the more likely that this may result, as a tempting price is always forthcoming for good specimens, dead or alive. If the schemes for the re-afforestation of Scotland, of which to-day we hear so much, should take substantial form in the near future, it may afford the best hope that such a consummation may yet be averted.

[1] *British Quadrupeds.*

THE BEAVER AND SCOTTISH TRADITION.

III.

THE BEAVER AND SCOTTISH TRADITION.

It is but natural that the wolf, as the most recent of our extinct animals to be extirpated, should have left a considerable volume of tale and tradition; but another and most interesting species, the beaver, appears to have died out of popular memory entirely. This animal was formerly an inhabitant of England and Scotland; and to-day it is still to be found in a state of nature in several localities of the continent of Europe.

That the beaver once inhabited Great Britain is proved beyond doubt, not so much by the written letter of history as by the discovery of its remains, both in England and Scotland. Singularly enough, there seems to be no record of any such discovery in Ireland. The whole subject has been ably and exhaustively treated by Mr. J. E. Harting,[1] who shows that the

[1] *Extinct British Animals*; Trübner, 1880.

beaver was apparently not yet uncommon in Wales about A.D. 940; that the value of the skin was then very considerable. Mr. Harting also gives much interesting information as to place-names in Wales apparently derived from the Welsh words signifying the beaver; and a list of the remains of this animal which have been from time to time discovered in Great Britain.

Before entering on the question of the beaver in Scotland it may be of interest to advert to the matter of its present status in Europe. Writing in 1857, Blasius states that although then still to be found on the Elbe, they were already approaching extinction. Other localities mentioned by him are the Havel, the Oder and the Weichsel, East Prussia and Silesia; but he states that they were more common in Lithuania, Poland, Scandinavia and Northern Russia. To come to the present time, the subject of the beaver in Europe has been well summarised in an article in *The Field* of 20th February, 1909, under the heading of 'The present status of the European beaver' and signed 'J. E. H.' For full details readers must be referred to this article; here it may be sufficient to note from it that, according to the testimony of M. Mingaud, conservator of the

Natural History Museum of Nimes, the beaver still exists in some numbers in the Rhône; but M. Mingaud calls for more adequate protection lest it be exterminated from this 'its last haunt in France and one of the last in Europe.' The present status in other European countries is also touched on; and from the authoritative testimony quoted in this paper we find that as regards Russia the beaver exists to-day in the governments of Minsk, Moghilev and Volhynia, and is in less danger of persecution to extinction owing to the great fall in the price of 'castoreum'—a product no longer valued in medical practice; the status of the animal in Norway is likewise dealt with.

Beavers still exist in the Elbe in spite of Blasius' fears in 1857 that they were even then in danger of extinction. In some places indeed, as in Prussian state forests, they are protected. In a letter on this subject to *The Field*,[1] Mr. Henry Scherren quotes Dr. Martens of Magdeburg as estimating the number of beavers in the Elbe and its tributaries, the Mulde, Saale, Nuthe and Ehle, in 1904 as somewhere between 150 and 200. As regards Norway a note to *The Field*,[2] signed 'G. L.,' states that the beavers are said to be on the increase in South-

[1] December, 1908. [2] December, 1908.

Western Norway, and mentions several localities where colonies have long been known or have recently appeared.

The beaver from earliest days has been the object of unremitting persecution. Apart from its value as food, the fur has ever been greatly in request; the curious musk-like product, castoreum, was highly esteemed as a remedial agent for almost every ailment; and at a later period its fur was extensively used in the manufacture of hats; so that 'beaver' and 'castor' were both constantly used as synonyms for 'hat.' Fortunately for the beaver, the introduction of silk in hat-making and the decline in the demand for castoreum somewhat lessened the persecution; but the fur is still much sought after, and the beaver is, it is to be feared, everywhere a diminishing race. Whether our European beaver and that of America are to be considered as identical seems to be still in dispute; but the differences, if any, are so slight that they are practically the same species.

The beaver bears its part in the science of heraldry, although that cannot be held to be any proof of its former existence in our country. In reply to enquiry, one of our chief authorities on that subject has courteously supplied a list of twenty-two families, some of them Scottish,

who use the beaver as a crest;[1] it also appears on the shield of three families, one in Cheshire appearing in 1595, when, however, the animal had been long extinct in the United Kingdom. It does not seem to have left any record of its former presence in the place-names of Scotland; those enumerated as occurring in England in the work above referred to are few in number and perhaps not always convincing. Nothing is more apt to lead to error in this connection than to infer derivation from similarity in sound in present-day form.

It must at once be admitted that the evidence of the existence of the beaver in Scotland as indigenous inhabitants, although indubitable, is both remote and exceedingly scanty. That at one time they did so exist is proved by the finding of their remains in different parts of the country. The late Edward R. Alston, F.L.S., F.G.S., epitomises the matter thus:[2]

'The palaeontological and traditionary evidence of the existence of the beaver in Scotland has been investigated by Neill[3] and by Dr.

[1] Alexander, Baynham, Beaver, Beever, Bell, Bevers, Besook, Beynham, Brooks, Coram, Corham, Danskine, Dimsdale, Eaton, Fenwick, Howell, Maclagan, Molineux, Sadleyr, Symcock, Symcott, Trowell.

[2] *Fauna of Scotland*, 1880. [3] *Edin. Phil. Journ.*

Wilson.[1] The first recorded sub-fossil skull was one from Perthshire, presented by Dr. Farquharson to the Scottish Society of Antiquaries in 1788; others have since been found in Roxburghshire and Berwickshire. Of its range into the historical period the evidence is not very satisfactory. In the twelfth century Giraldus de Barri, who met with beavers in Wales, was informed that they still existed in one river in Scotland, but were rare. In a capitular of export duties of David I., 1124-1153, skins of *Beveris* are included;[2] but they are not mentioned in a similar Act of 1424. The late Prof. Cosmo Innes, however, pointed out to me that too much trust must not be given to these documents, as the lists of commodities appear in some cases to have been adopted from similar English or foreign enactments. Boethius includes *Fibri* among the wild animals which were found round Loch Ness "*incomparabile numero*," and Bellenden follows him; but, as usual, little or no reliance can be placed on his testimony, which was probably founded on hearsay.'

It is very strange that an animal in many ways so peculiar and so valuable, and one from its habits and mode of life bound to come under

[1] *New Phil. Journ.* [2] *Acts Parl. Scotl.* I. p. 303.

observation, should have left so little trace of its former presence in Scotland. In such Gaelic literature as is left to us, in song, folk-tales or living tradition, reference to it seems to be absolutely wanting. It is true that there are *said* to be traditions as to its existence; but on examination these do not seem to be very satisfactory. We are told that it has left its name, *Los-leathan* or *Dobhran los-leathan*, the broad-tailed otter; and Stuart[1] says that it has left its radical Gaelic name, *Dobhar-chu*, the water-dog; but we are not told *where* the first-mentioned Gaelic name, *Los-leathan* is to be found; it certainly would seem to point to the beaver. *Dobhar-chu*, on the other hand—literally water-dog—appears equally applicable to the otter, or rather more so, for the otter is certainly more dog-like than the beaver.

The Rev. George Calder of Strathfillan, an acknowledged authority, writes to me that *Leas-leathan* is given in the *Highland Society's Dictionary* as 'beaver,' and *los* as rarely meaning tail by Armstrong; that *loss*, as meaning tail, is not infrequent in old Irish. He goes on to say that 'out of dictionaries one seems to get some gleanings; but in the

[1] *Lays of the Deer Forest.*

language itself I have never seen any trace of beaver.' Another well-informed correspondent, the Rev. Charles M. Robertson, Craighouse, Jura, refers to Shaw's *Gaelic Dictionary*, 1780, as giving *Dobhran-leaslathan, a beaver*, and to Armstrong, 1825, who has *Dobhran-leaslan, an otter*, otter being probably a slip of the pen. He continues: '*Leas-leathann, a beaver*, is given on the authority of common speech in the *Highland Society's Gaelic Dictionary* as Gaelic for beaver. *Leas-leathann* is given along with *Dobhran-donn* and *Dobhar-chu* in the English-Gaelic part of the same work, and with *Dobhar-chu* in MacLeod and Dewar's *Dictionary*. Macfarlane's *Vocabulary*, 1815, has *Beaver—Douran, Leasleathann.* "*Dobhar-chu*, a kind of otter supposed to be the king of the species," is given by the *Highland Society's Dictionary* on the authority of Llhuyd's *Archaeologia Britannica.* In Dinneen's *Irish-English Dictionary*, 1904, the name is stated to be pronounced *Dobhrachu* in County Donegal, and used of a mythical animal like an otter.

'There is nothing here to prove that the beaver ever existed in Scotland or in Ireland. All that is certain is that the Gael had a traditionary knowledge of the animal, but whether the knowledge was derived from travellers'

reports from abroad, or from a time when the animal existed at home, there is nothing to show.'

As already said, all evidence, so far as it at present goes, points to the probability that the existence of the beaver in Scotland must be referred to a very remote period. Mr. Robertson, to whom I am much indebted, writes that he finds no mention of the beaver in the enumeration of the animals and birds of Ireland in one of the Ossianic ballads in the *Book of the Dean of Lismore*, and concludes:

'The impression left on my mind at present by the resemblance of the Gaelic *los leathann*, a beaver, to the Welsh *llost-lydan*, is that the Gaels were not familiar with the animal in Ireland, that they found it in Scotland on their arrival there, and that they borrowed a name from the native Pictish inhabitants. That view may, of course, be overturned or confirmed when further light is obtained on the origin of the names *leas-leathainn* and *llost-lydan*.'

By far the most interesting of the various dictionary references seems to be that to be found in M'Alpine's *Gaelic Dictionary*, '*Dobhar-chu*, a kind of otter which has no existence but in Donald's imagination; the price of its skin, which can heal all diseases, is its full of pure

gold when made into a bag—a Chimera.' Now here, at last, we seem to have an undoubted traditionary recollection of the beaver, extending down to quite recent times; for the 'healing of all diseases' points surely to the mediaeval belief in the medicinal virtues and great value of the castoreum, and the skin itself in ancient days commanded a very high price; yet the tradition was already so dim that it had no significance for M'Alpine, who dismisses it as a 'chimera.' To the most intelligent and well-informed Gaelic-speaking Highlanders of to-day the words *Dobhar-chu* or *Dobhran-los-leathann* appear to have but the vaguest or no significance; at most one will be told 'a kind of otter.' Such is the experience at least of those who have kindly undertaken to assist in investigating the matter recently. One cannot but infer that the existence of the beaver in Scotland must be relegated to a very remote period indeed, and that they were extinct long before the time when they disappeared from Wales. Possibly, too, they may have been always sparsely distributed, and confined to a few favoured localities.

In 1875 an interesting attempt was made by the then Marquis of Bute to establish a beaver-colony in that island. A suitable piece of

wooded ground, through which runs a stream, was fenced in, and in 1875 the first beavers placed in it. For many years the colony increased and throve. A very interesting account of this experiment was published by their keeper in 1880, and is reproduced in full in Mr. Harting's work mentioned above. Enquiry recently made has brought the information that the beavers did very well for a time in semi-captivity, but having been, perhaps, somewhat neglected, died out about eighteen years ago. A correspondent who was intimately acquainted with the whole course of the experiment writes that the first beavers arrived in January, 1875; that the keeper who had charge of them is now dead, but the writer remembers that they seemed to die out one by one, and feels sure that they were all dead long before it was known, as it was always very difficult to see them at work. He mentions that they did wonderful work in plastering the breast-wall of their dam in the stream to keep the water from getting through. Willow, ash, and elm were their favourite trees; they liked clean bark, and they cut a few larch and Scotch fir, but not many.

It would be interesting if some of our Scottish proprietors were to try this experiment again.

There must be many places well adapted by nature for such a purpose, and one can imagine that a beaver-colony would be a fascinating addition to a Highland estate. If a site were chosen so as to be commanded from a retired spot where a concealed shelter could be contrived, a novel and interesting occupation would be found in watching, with a powerful telescope, the work of these animals in what might practically be a state of nature.

THE BADGER.

IV.

THE BADGER.

A QUEER, quaint, old-world animal; clumsy in form and bizarre in colouring, timid and shy, shunning daylight, man and his works, the badger, the largest of our remaining carnivora, is also one of the most interesting. From its rarity and secluded habits it is one of the least generally known; indeed people live for years in its immediate neighbourhood without being aware of the fact, unless through some accidental occurrence. Once generally distributed over the whole country, it is even to-day not so uncommon as is often supposed; although doubtless a decreasing species it can hardly yet be said to be verging on extinction, and is still to be found, more or less sparsely, from the North of Scotland to Cornwall and in many parts of Ireland

The badger is classed with the *Ursidae*, and in some ways shows considerable affinity to the bears, as for instance in his great muscular

development, shambling gait, and chiefly in his plantigrade method of walking with the whole foot, from heel to toe, upon the ground. The thirty-eight teeth with which his enormously powerful jaws are armed betray the omnivorous nature of his diet. He measures some 3 feet in length, including the short tail of 5 or 6 inches. His short and powerful legs and feet are provided with long and strong claws, particularly the fore-paws. His height is barely a foot, so that with his long coat he appears to brush the ground. In colour the upper parts are of a uniform silvery grey, the individual hairs being banded with blackish-brown and white, the underparts and legs are black, the head white with a black stripe on each side from the nose over the eye and ear. A full-grown badger weighs from 20 to 30 lbs., the male being somewhat the heavier. Mr. A. E. Pease, M.P., in his monograph on the badger,[1] says that they have been known to weigh up to about 40 lbs.; but that the heaviest that he had ever weighed in his own experience scaled over 35 lbs. The jaws are immensely powerful, the under-jaw, as already remarked by Blasius,[2] being interlocked with the upper jaw; the canine teeth of the under-jaw are particularly

[1] Laurence and Bullen, 1898. [2] *Säugth. Deutschl.* 1857.

long and strong. Under the tail is situated a glandular pouch in which is secreted a strongly-smelling substance. Opinion seems to be divided as to the use of this secretion, some holding that the animal derives nourishment from it during its winter retirement—a view which one is somewhat surprised to find favoured by Mr. Pease—it seems too much akin to the old belief that the bear subsisted by sucking its paws in winter, to obtain ready credence. Von Tschudi,[1] speaking of this belief, remarks simply that it is false.

Of strictly nocturnal habits, the badger spends the day below ground in his earth, in the formation of which he shows perhaps more intelligence than in other directions. The tunnel is long and deep, and frequently branching, each terminating in an enlarged living chamber, and each earth having several exits or bolt-holes. The living-chamber is warmly furnished with dry grass, moss, leaves and bracken, replaced yearly by fresh material. Mr. Pease gives an interesting account of the method by which the badger carries in his bedding, retiring backwards into the earth with the heap of material gathered into a bundle between his fore-paws and his head. The badger is often spoken of

[1] *Thierleben*, 1854.

as solitary in its habits, but this seems to be erroneous; he is monogamous and is said to pair for life. Mr. Pease once enjoyed the singular spectacle of seeing no less than seven full-grown badgers issuing at night-fall from one earth. Another imputation against him, that of foul-smelling and unclean habits, is also unfounded. His earth is usually sweet and clean, the animal retiring when necessary to some distance from his habitation. There is a tradition, repeated by the German writers, that the fox is in the habit of evicting his powerful neighbour from his comfortable abode by means of be-fouling the chamber of *malice prepense*; but this also is groundless fancy, for foxes and badgers are known to inhabit the same earth; such earths, it must be remembered, being often very large and with many ramifications. Here, about the month of March, the young come into the world, according to Mr. Pease usually two, sometimes three, never more than four in number, although the German writers say from three to five, and give January and February as the usual dates; but locality and climate may account for the difference.

In the matter of food the badger is decidedly omnivorous, nothing, almost, seeming to come amiss. All manner of roots, vegetables and

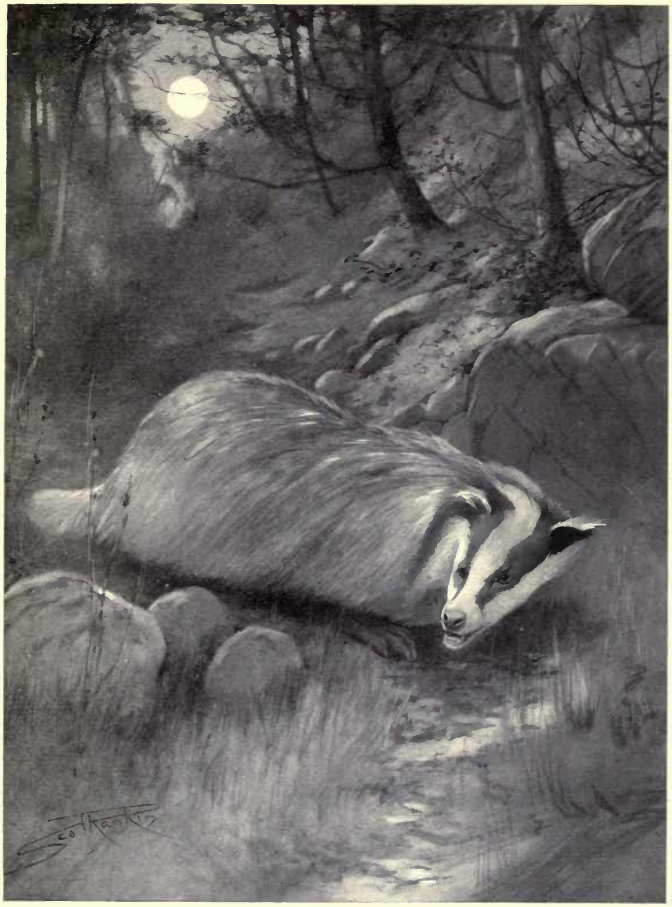
fruits, beetles and insects of all sorts, reptiles, snakes, young birds, eggs, mice, and the smaller animals generally, all seem welcome. Honey and wasp-grubs have special attractions for them as for their distant relative the bear; and on the continent of Europe they do at times much damage in the vineyards. In this country there is no doubt but that young rabbits are a favourite delicacy, and it may be accounted to the badger for righteousness that he helps to keep down these ubiquitous pests.

On the whole he may be regarded as a harmless, if not absolutely a useful animal; but that an occasional individual may develop abnormal and vicious propensities cannot be denied. A striking instance of such depravity has come to my knowledge. A forester living in a remote cottage in the heart of one of our largest deer-forests had a number of fowls in a rude turf-covered out-house. One night there was a great outcry among the fowls, and in the morning it was found that some animal had forced an entry and carried off one or more of the inmates. The door was made secure, but next night the alarm was renewed. At day-break the forester found that the burglar had this time obtained entrance through the roof, and being unable to return that way, remained a

prisoner. Fetching his gun, he had the satisfaction of slaying a large badger, caught *flagrante delicto.* Such cases must, however, be considered as exceptional, and analogous to that of the squirrel that has acquired the bad habit of robbing little birds' nests of eggs and young, or of the very rare case of a kestrel that has taken to carrying off young pheasants from the rearing-field; perhaps as protest against modern unsportsmanlike excesses in artificial game-rearing!

A number of years ago there was some correspondence in *The Field* as to the alleged destruction of fox-cubs by badgers. In the end the question remained undecided as to whether such cases as had undoubtedly occurred had been the work of some bad-tempered old badger, or of an old dog-fox of similarly unamiable character; they could not be attributed to any general habit of the species as a whole.

It seems to be agreed on all hands that badgers are a thirsty race and drink much water. The popular notion that the badger hibernates, as the dormouse, for instance, does, is incorrect. They spend, indeed, much of the winter in sleep in their cosy underground chambers, especially in long-continued hard



BADGER

weather; but the unmistakable evidence of their footprints shows that they do come forth at no very long intervals.

Although the badger may sometimes be seen sunning himself just within the mouth of his earth, he seldom or never issues forth until nightfall, when he goes out on his rounds after food, returning before daybreak; indeed, if he should perchance have somewhat miscalculated his time, he comes shambling and rolling home in a great hurry. One of the means of capturing him is by means of a sack pegged inside the mouth of his main entrance during his absence, with a running cord round the mouth of it, secured to a peg. The badger, being found in his rambles and pursued by dogs, rushes in precipitately and finds himself a prisoner. From his cunning he is difficult to catch in ordinary spring traps.

The usual method of capturing him, at least in the south, is by locating him first in his tunnel by means of terriers, and then digging down until he is reached—a work often of much time and toil. If the attention of the badger is not continuously held by the terriers, he will scrape his way into the earth faster than the hunters can dig after him. A full account of this procedure is given by Mr. Pease in the

monograph already mentioned. His captives were not killed but released elsewhere.

In Scotland this method is seldom very practicable, as our badgers are usually found in rocky ground or in cairns; or else in earths on a hillside where digging would be too much like railway-tunnelling to be feasible.

In Germany the Dachshund or 'badger hound' takes the place of our terriers. The German writers speak of the flesh as eatable; and the fat had, both there and here, a great reputation as a cure for rheumatism. There used to be, and may yet be, a very general custom in South Germany of hanging a badger-skin as an ornament on the harness or collar of farm horses.

Our ancestors had a quaint belief that the badger's legs were shorter on one side than on the other, the better to run along a hill-side! The difficulty of the return journey does not seem to have occurred to them. This story probably had its origin in the shambling, rolling gait of the animal.

The name badger is said to be derived from Latin *bladarius*, a corn-dealer (cf. French *blaireau*), from a supposed habit of storing up corn for winter supply. Sir Herbert Maxwell[1]

[1] *Memories of the Months.*

tells us that in Middle-English *Bager* meant corn-dealer. The Scottish name *brock* is of course the same as the Gaelic and Irish *broc*, Cornish and Breton *broch*, the root being apparently doubtful. There is evidence of its former wide distribution in the place-names still extant, both in the Lowlands and, more rarely, in the Highlands; as 'Brocketsbrae, Brockhole, Brockloch, Brockwood, Broxwood' in the former; 'Garaidh-nam-Broc,' badgers' den, to take only one example in the latter.

The cruel pastime of badger-baiting has also left its mark in the English language in the every-day term 'to badger.'

The badger is found throughout most parts of Europe and North and Central Asia, south of the Arctic circle. According to Blasius it occurs in Italy, but not in the other Mediterranean countries; its American congener belongs to another species. In our own country it is still to be found in many districts of England, Scotland, and Ireland, although in ever decreasing numbers; it has apparently never been known in the Scottish Islands. It still exists as a breeding species, to the present writer's knowledge, in Argyll and Perthshire. According to Harvie-Brown[1] it is to be found,

[1] *Vertebrate Fauna.*

though decreasing, in Sutherland; is now quite rare in the North-west Highlands generally, and in the Moray district. The late Mr. Robert Service, whose death, since this paper was first written, is greatly regretted by all Scottish naturalists, sent me the following notes as to the South-west of Scotland: 'At intervals of one or two years—at widening intervals it must be said—a badger is heard of as being killed at some locality or other in Solway. It is questionable if these are blood relations of the old original stock. I believe they are not, but are most probably casual introductions or casual wanderers from across the Borders. At the Glenkens end of the Stewartry and in Annandale (upper part at least) there is no doubt the old native badger remains, though it is to be found in very meagre numbers indeed. In recent years I have noted their unmistakable footprints on the shore.' With regard to the Border area the subjoined notes from Mr. A. H. Evans, whose volume on the Fauna of the Tweed area[1] may be further consulted, are of interest: 'Badgers are known to occur still in various parts, notably in the hills near

[1] *A Vertebrate Fauna of Scotland, the Tweed Area, including the Farne Islands.* By A. H. Evans, M.A., F.Z.S. Edinburgh, 1911.

Yetholm, and are not so uncommon as might be supposed from the scanty notices in print. Badgers are by no means exterminated in the Borders; they have probably held their own for the last twenty years without any perceptible increase. Their chief haunt is the Cheviots.'

For obvious reasons it would be unwise to define more particularly the existing haunts of this interesting animal. Is it too much to hope that those who are in a position to do so will exert their authority and instruct their keepers and foresters to leave the few remaining representatives of this ancient British race in peace?

THE GREY SEAL AT CLOSE QUARTERS.

V.

THE GREY SEAL AT CLOSE QUARTERS.

WHEN staying during a recent summer on the shores of Loch Feochan a somewhat unusual opportunity occurred of watching at close quarters a very fine specimen of the great or grey seal, *Halichaerus gryphus*. Looking down from the front door, at the first bend of the loch seawards, there is a rocky reef or islet just half a mile distant, entirely submerged at high tide. One morning, happening to glance in that direction at ebb-tide, a light-coloured speck was noticed which drew attention as being unusual. This through a stalking-glass was seen at once to be a large seal. The rock on which he was lying is only some 300 yards from a projecting point of the shore, and some small bushes on it promised cover.

No time was lost in proceeding thither, when a careful stalk brought the observers to the outmost bushes, the glasses brought to bear,

and a most interesting spectacle revealed. The great beast lay with his huge bulk extended on the sea-wrack, his head toward the shore, his watchful gaze ever on the look-out for possible disturbers as he slowly turned his dog-like head. The powerful lenses seemed to bring him almost within touching distance, and disclosed scars and gashes on his head and neck, some seemingly but half-healed. There was no room for doubt that we saw before us a magnificent old bull of the great or grey seal, fresh from battle with his kind, as is their way at mating time.

For an hour or more this fascinating spectacle was watched. The bright light of a fine summer day shimmered on his coat, which seemed to change from silvery grey to darker grizzle as his sluggish movements now and again changed the fall of the light or the lie of his coat. Gradually the rising tide encroached until it encircled the little height on which he lay, then at length he stretched his head and neck, and with a graceful gliding motion slipped downward without splash or apparent exertion into the depths—and was seen no more.

It would have been just as easy to have brought the Männlicher rifle instead of the stalking-glasses;—it was a fairly easy 'chance'

for the expert;—but what would have been the gain? A useless carcase and the consciousness of the uncalled-for destruction of a rare and interesting creature, in place of a pleasant memory that will always remain.

The grey seal is regarded as a shy and retiring animal, by no means frequently to be found in what may be termed inland waters, although common enough in the outer islands and the western coast of Ireland.

What the weight of that great creature may have been one can only guess. Bell[1] writes of one reported to him from County Galway as having weighed 6 cwt., and of another from Connemara which was actually weighed at Dublin and found to be $3\frac{1}{2}$ cwt. Our guess was just about the latter weight.

[1] *British Quadrupeds.*

'WEE TIM'ROUS BEASTIES.'

VI.

'WEE TIM'ROUS BEASTIES.'

A NEAT glass case, about two feet by one in length and breadth, enclosing an artistic representation of a mossy bank, shaded by gorse and brackens and overhanging a bend of a gravelly streamlet; on a little boulder in the stream two tiny creatures in black and white velvet; on the bank in life-like attitudes, eating, playing or resting, ten more 'wee beasties'—altogether a triumph of the modern taxidermist's art. Here are six pairs, male and female, representing six separate well-defined species of our lesser mammals, all of them collected from less than an acre of the rough hillside on the border of a West Highland loch. Usually classed together as 'mice' by the casual observer, there is only one mouse proper among the six—the common or house mouse not being considered worthy of admission; of the remaining five species, three are shrews and two are voles. These tiny, glossy, silky-furred creatures, alike

in many ways and yet so distinct when we come to examine them more closely, are all around us, some one or other and often all of them wherever we are, if once outside of town or village; and yet we shall hardly see them unless we search for them, and that with care and caution. They are but a timid folk, and not much abroad by day, so that, near neighbours as we may be, many of us remain for a lifetime unaware of their existence.

The two central figures on the little mound are really 'mice,' the long-tailed field mouse or wood mouse, *Mus sylvaticus*, and are doubtless the prettiest of the little company. Reddish-brown above, though varying much in tint, and whitish beneath, they are noticeable at once from their bright prominent eyes, long ears, and generally elegant form. The head and body measure some $4\frac{1}{4}$ inches and the tail nearly the same. Distributed widely over Europe, this mouse is plentiful all over the mainland of Scotland and the Inner Isles, and is also found in Orkney, but not in Shetland nor the Outer Hebrides. In winter it frequently comes for shelter to out-houses, barns, and dwelling-houses, laying up for itself a store of seeds, corn and such like, and it must be confessed that this pretty little creature is some-

times a nuisance in gardens when numerous; but it is very engaging, and surely, in spite of the gardener, we have room for it.

There is another member of the *Muridae* or mice occasionally, though rarely, found in Scotland—the little harvest mouse, *Mus minutus*, which has been reported from Midlothian, the eastern lowland counties, and even so far north as Aberdeenshire. This tiny creature, of much the same colouring as the last, but only some 2½ inches in length, builds a wonderful nest of interwoven corn-stalks or grasses suspended between the standing stalks of corn or reeds. It has not been found in the west, so is unrepresented here.

The brownish, somewhat larger animal under the curled frond of springing bracken, with large, round stumpy head, small eyes and ears, and short tail, is often termed the short-tailed field mouse; it is no mouse at all but a vole, the field vole, *Arvicola agrestis*. It is plentiful, sometimes far too plentiful, throughout Scotland and the Islands, although again not in Shetland. It feeds on vegetable matter of all sorts, and is the animal that caused so much damage in 1890-1 as to induce the Government to appoint a Committee, under the chairmanship of Sir Herbert E. Maxwell, to examine

into the question. Their report, although of great interest, was practically of a negative nature, as it was not found possible to refer the extraordinary increase of the voles to any one specific cause. These voles multiply very quickly under favourable conditions, as of weather and food supplies. The so-called 'Lemming-years' of Scandinavia supply an analogous case. It is often asserted that a principal cause of the vole plague has been the destruction by gamekeepers and others of the birds and beasts that prey on them; yet similar outbreaks are mentioned in history as far back indeed as the year 1587, when the destruction of 'vermin' to any extent was surely unknown. Wise Nature came to the rescue, as always; for an extraordinary influx of birds of prey appeared on the scene, including numbers of short-eared owls; a singular circumstance being that these birds nested more than once, and laid up to twelve and thirteen eggs instead of five or six at most.

Sitting up in a characteristic attitude, feeding on a grass-stalk held between its little fore-paws, is another vole, somewhat smaller, neater and prettier than the last, the red or bank vole, *Arvicola glareolus*. This is of a reddish chestnut colour above and whitish beneath, with

white feet and paws, the tail slightly longer than in the field vole and well clothed with hair, forming a tuft at the end. This vole was first described as a Scottish species by MacGillivray, and it is usually assumed that it had previously been confused with the common vole. It is, however, well to remember that it is quite possible that the discovery of a new species in a given district may be owing to the fact that it has only recently reached that locality; and that former observers may very well have omitted it, for the simple reason that it was not then present there. The red vole resembles the field vole in its food and habits. Bell[1] relates that he has known one of this species to kill and eat a shrew; it is a good climber, and has been accused of robbing small birds' nests of young or eggs; indeed it may be said to be decidedly omnivorous in its tastes. This animal was a first record for Argyll, having been identified in 1904, and in some localities at least appears to be the predominant species in that area. Another British member of the vole family, the water vole, *A. amphibius*, often incorrectly termed the water rat, is common in the same district, although not in the very restricted area under consideration, and therefore unrepresented. The

[1] *British Quadrupeds.*

black variety of this vole, at one time thought to be specifically distinct, appears to be here predominant, as is indeed not unusual in the north and west.

An addition has recently been made to our British fauna by the discovery by Mr. J. Millais of a distinct species of vole in Orkney; but this is of course outside our limits.

The little mouse-coloured creature with the long-pointed snout peering over the edge of the bank belongs to a different family, *Insectivora*, and will at once be generally recognised as the common shrew, *Sorex tetragonurus*, which is to be found all over the mainland. As to the Islands, it has been reported from Tobermory and from Islay, but not from the Outer Islands. The shrews feed on all manner of insects, slugs and worms, and are decidedly carnivorous in their tastes and quarrelsome in disposition. Our superstitious forefathers believed that they were capable of injuring cattle by running over their limbs, the cure for such ailment being to stroke the affected parts with a branch of a 'shrew-ash.' As we know from Gilbert White,[1] a shrew-ash was a tree in which an auger-hole had been bored, into which a poor little living shrew was inserted and the hole plugged up! Such an

[1] *Natural History of Selborne.*

ash existed at Selborne Church as lately as 1770, or thereabouts. A curious and as yet unexplained fatality seems to attend the shrew family in autumn, when numbers of them are yearly found lying dead on roads and footpaths, outwardly uninjured. If some of these were sent to a competent authority, such as the Royal Museum of Edinburgh, for post-mortem examination, the mystery might be solved.

A pair of very tiny animals sitting among the herbage in a little hollow always attract attention, and are generally supposed to be half-grown specimens of the preceding species; such, however, is not the case. These little creatures, the lesser or 'pygmy' shrew, *Sorex pygmaeus*, are the smallest not only of Scottish, but of European mammals; somewhat smaller than the harvest-mouse mentioned above. Only some two inches in length of head and body, with a tail about the same in length, they are rather rougher in the coat, and especially in the tail, than the common shrew, from which they also differ in dentition; in colour they are much the same, somewhat lighter in the under parts, perhaps; but all the shrews are liable to considerable differences in colour.

There is still much to be done in ascertaining its distribution throughout the country. First

described by Jenyns in 1837, it is probably much more common than is often supposed. As has already been said, absence of records does not necessarily imply remissness or ignorance on the part of the older observers; there is always the possibility that the species was not then present in a given area.

Meantime our little specimens, like the bank voles, are interesting as being the first recorded, in 1904, from this county. This little shrew has been found in most of the Islands, where it is almost certainly the prevalent species. A curious record for so tiny a creature is one in 1897 from the summit of Ben Nevis!—but there always remains the possibility that it may have found its way there in the packing material of some goods carried up to the 'Hotel' at the top. Another interesting instance is that of a specimen sent to the present writer in November, 1908, by the head stalker of Coig-na-fearn deer forest with the following note:

'I think the enclosed is the smallest of our mice. It was got on its travels in Coig-na-fearn Forest at a height of not less than 2000 feet above sea-level, and crossing a piece of snow.'

On being sent to the Royal Scottish Museum the identification of the specimen as *S. minutus* (v. *pygmaeus*) was confirmed by Mr. Eagle-

Clarke, and recorded in *Annals of Scottish Natural History* for April, 1909. 2000 feet seems rather a terrible journey for such tiny legs and feet!

We come now to the last pair of the little denizens of our case, the quaintest and perhaps most interesting of all, and, judging from experience of visitors, certainly the least known. These are the little animals in 'black and white velvet' first mentioned—the water shrew, *Crossopus fodiens*. First recorded as an addition to our Scottish fauna by the late Dr. Scoular, who found it near Glasgow,[1] it is not uncommon as far north as Sutherland, Caithness and Orkney; but although reported from Arran it has not been observed in our Western Islands, nor in Ireland.

This is a larger animal than the common shrew, black or brownish-black above, with the under parts white, the black and the white meeting in a distinct line along each side; the tail is somewhat compressed, with stiff whitish hairs, the toes fringed in like manner. Living by streams and ditches, the water shrew is as much at home in and beneath the water as on land, diving and swimming after its food, consisting of every kind of larvae and insect, fish-spawn and small fish. They eat any kind of

[1] *Mag. Natural History*, VI. p. 512.

flesh, and have been found devouring dead animals and carrion; they seem to be somewhat pugnacious, and not altogether an amiable race. When swimming underneath the water, their velvety glossy fur studded with pearl-like globules of air, they are really beautiful objects; but being, like the whole race, of nocturnal habits as a rule, and but occasionally abroad by day, it is not often that they are seen, unless very patiently looked for. A variety entirely dark-coloured used to be distinguished as a separate species, but is now regarded as merely a varying form; indeed the water shrew is subject to great differences in colour.

Possibly this account of some of our little neighbours, found within a few yards of the writer's windows, may induce others to take up the study of a very engrossing chapter of the wild life still around us.

A FRIENDLY STOAT.

VII.

A FRIENDLY STOAT.

For many weeks during this winter we have had a most interesting and somewhat unusual visitor, literally about our door, in the person of a white stoat or ermine. It was first noticed toward the end of November, hunting among the shrubs under the windows; it was then already in its winter snowy dress, save only a patch of brown on the nape of the neck, which patch remained throughout the winter. Often seen during December, it appeared gradually to grow more confiding and tame, frequenting the banks of a little burn flowing close to the house, where on one occasion it was seen climbing with perfect ease in the branches of a tall hazel bush, some ten or twelve feet at least from the ground. According to our winter custom, food for the birds was each morning put out, and by the second week of January the little ermine was to be seen running in among the crowd of chaffinches, blackbirds,

tits, and other pensioners, selecting a suitable morsel, with which it scampered off into the nearest bushes. A lean-to outbuilding at the back of the house, under which the rats had made their runs, proved an attractive shelter for our pretty visitor, although not more than four or five yards from the windows; from this it would dart out to the food-supply and return with its chosen tit-bit. Never once did it make the slightest attempt to attack any of the birds feeding there in flocks; nor did they seem to take much notice of their somewhat uncanny visitor, merely fluttering aside a few yards until it disappeared again.

Nothing could be more graceful or agile than this lithe little creature in all its movements and actions, sometimes sitting up like a squirrel, or bounding away like a flash when a specially attractive morsel was secured. As the days lengthened and became milder its visits grew rarer, its regular stay coming to an end about the middle of February, some three months from its first appearance. By this time, no doubt, the field-mice and voles were stirring from their winter torpor, and its natural prey would be more to its taste than the food provided for the birds, supplemented as that was by little delicacies specially provided for it under

Stoat in Early Winter

an inverted box in a quiet corner. Even in the first week of March, our little friend was seen playing like a puppy with a piece of white paper, not a gunshot from the house.

Some winters ago a white stoat paid us a similar visit, and might have remained; but most unfortunately found an untimely end in a rat-trap placed in the afore-mentioned out-house, where no one had dreamt that it would venture.

This friendly visit has had a result that seems worthy of emphasis. Previously there were always a certain number of rats about; but since the stoat first appeared not one has been seen. There were also moles in the immediate neighbourhood which caused trouble and annoyance; but these, too, have vanished. One reads much of late of the plague of rats which threatens to become not merely a nuisance but a positive danger; yet everywhere the stoat and the weasel are labelled 'vermin' and ruthlessly destroyed by the gamekeeper, who, after all, is only obeying orders given to him by those who might surely know better.

It is an undisputed fact that the game-preserver has no worse enemy than the rat; yet he spares neither time nor trouble to destroy the very means provided by an all-wise Provi-

dence to keep them in check. It is an old story this, the heavy hand of unthinking and narrow-minded men destroying the balance of Nature; yet Nature's laws are not to be broken with impunity. Some of us may yet see the day when stoats and weasels will be imported at great expense, and all too late; just as was seen in Australasia when the rabbit trouble first threatened to overwhelm the run-holders there.

A VANISHING BIRD.

VIII.

A VANISHING BIRD.

If we look at the history of this country of ours there is vividly presented to us the fact of constant change taking place in all things, animate or inanimate. We know, for instance, that the greater part of Scotland was once clothed with dense forest, of which here and there a remnant only remains; much that is now fertile field or broad pasture was but recently bleak or impassable morass. These changes, together with the steady advance of what we call civilisation, bring in their train corresponding changes in the wild inhabitants of the land. Some old world creatures, such as the bear, the beaver, the boar, have long since passed away; some more familiar forms known to our fathers have already gone from us; and some that are still with us, but in ever-diminished numbers, are apparently on the very verge of extinction.

In this latter category one noble bird stands

out prominently as being intimately associated with our own West Highlands — the white-tailed eagle, otherwise known as the sea eagle or erne; in scientific nomenclature *Haliäetus albicilla.*

This eagle is widely distributed, being found throughout the Palaearctic region as far as Japan and Kamtchatka in the East, and down through China and India to Northern Africa; but is not found in America. It is at once to be distinguished from its congener, the golden eagle, by the light creamy colour of head and neck and the pure white tail; that is, in the adult bird; in immature specimens these marks of difference are wanting, the bird being more or less mottled all over with lighter and darker brown markings; but the species can at all times be distinguished by the fact that in the sea eagle the tarsus is bare, whereas in the golden eagle it is feathered down to the toes.

It is essentially a bird of the sea coast, though sometimes found inland, and is decidedly omnivorous in its diet. Nothing seems to come amiss to it; but it appears to live largely on the flotsam and jetsam—dead fish or any carrion —thrown up by the waves, on dead sheep, or indeed anything it can find or capture. It is impossible, however, to acquit it of committing

mischief by carrying off young or sickly lambs; and it is doubtless owing to the unceasing warfare waged against the eagles by the sheep farmers, and in perhaps a lesser degree the keepers in the interest of game, that this species, so recently a marked feature in the bird life of the West Highlands, is now verging on extinction. The rise and rapid spread of the sheep-farming industry in Scotland has been the cause of many changes and the disturbance of many ancient conditions; and so the erne is but sharing the fate of all that obstructs the march of our restless and ruthless modern times.

In comparatively recent days the sea eagle was a much commoner species than the golden eagle. Gray[1] says: 'Being a much commoner bird in Scotland than the golden eagle, the sea eagle has never been at any time in the same danger of extinction. Even in 1867 and 1868 there were numerous eyries in places which they have occupied from time immemorial. Between Loch Brittle and Copnahow Head, in Skye, for example, nine or ten eyries might have been seen. The Isle of Skye, indeed, may be said to be the headquarters of this conspicuous eagle in the West of Scotland, the entire coast line of

[1] *Birds of West of Scotland*, 1871.

that magnificent country offering many attractions to a bird of its habits. Nearly all the bold headlands of Skye are frequented by at least one pair of sea eagles, and it is at no time a difficult matter to get a sight of them. . . . On one property alone there were recently six breeding places.' But to this passage there is subjoined the following significant note:

'It is impossible, however, to conceal the fact that if the present destruction of eagles continues, we shall soon have to reckon this species among the extinct families of our "feathered nobility." During the last nine years, says my friend Dr. Dewar, a keeper in Skye has shot fifty-seven eagles on a single estate; and in a letter addressed to myself in November, 1866, by a keeper resident in the west of Ross-shire, the confession is made that during an experience of twelve years, he had shot no less than fifty-two eagles, besides taking numbers of eggs and young.

'Captain Cameron of Glen Brittle also informed me he has now seen as many as sixty-two sea eagles killed in Skye. No species of eagle could long survive such persecution.'

In Orkney they were, about the same date, a very common species. Harvie-Brown and Buckley, in the Orkney volume of their monu-

mental series on the *Vertebrate Fauna of Scotland*, give this note as received by them from Mr. Moodie-Heddle in 1888:

'White-tailed eagles were very common in Hoy, there being at one time ten or twelve pairs on the sea cliffs. He thought that they became extinct through being continually robbed,—the old birds at last became too old to breed; he never heard of many being killed.'

In the Argyll volumes of the above-mentioned series it is stated that in 1867 the sea eagle had become scarce in Mull; while at the time of writing, 1892, they were considered as being extinct as a breeding species. No doubt in the winter months many individuals may be seen there, as in other parts of the West Highland sea-coast area; but these are, doubtless, migratory birds, some perhaps coming from the north of Europe. Such wandering eagles are met with now and then even in far inland localities, and not in Scotland only, but as far as the south of England. This migratory habit seems to afford the only hope that even yet some of the ancient eyries might again be used as breeding stations if only some of our larger proprietors would see fit to afford them protection; finding in the grand spectacle of these noble birds sufficient repayment for the loss of an odd grouse or

hare or sickly lamb; but past experience hardly bids us hope for this.

The following notes on the white-tailed eagle are taken from a hitherto unpublished MS. of the late Edward R. Alston, F.L.S., secretary of the Linnean Society, and written about thirty years ago:

'This species seems now to be extinct in the Glencoe district. The well-known nest in a rowan tree on Loch Ba has not been used for several years. First the female was poisoned,—the male found another mate,—but both met with the same doom. Mr. Peter Robertson, head keeper at the Black Mount, told me in 1870 that he well remembered when there were several eyries annually in and about that forest. All of these were in trees except one on a low rocky island, on Loch Tulla, which might be said to be on the ground. He himself never knew this bird to build on a cliff, though he knew that they did so on the coast. An old forester, however, had told him that more than fifty years ago there used to be an eyrie on the Monich dhu, "Black rock," which overhangs Loch Triachatan in Glencoe. Most of these that Robertson remembered were placed on Scotch firs; one was within 200 yards of an eyrie of the golden eagle. Halliday in-

formed me that the eagle built every year in Catichol Glen in Arran up to 1847. In that winter the ledge of rock in which the eyrie was built fell down, and the eagle never returned. No eagle bred in Arran till 1870, when a pair built in the island, but deserted their eggs without hatching.'

These birds vary much in colour and size, the head and neck apparently becoming lighter with age. About 1879 a female, which had been committing great havoc among the lambs at Eigg, was, according to Harvie-Brown, 'reluctantly shot.' It was of a most beautiful silvery grey colour all over—Gray, who saw it, appears to have only once before seen a similar specimen; but albinoes have once or twice been recorded. The extreme spread of wings varies in individuals from six feet to more than seven feet six inches—which latter width is about the average.

There are various tales and traditions, in this as in other countries, of children having been carried off by these powerful birds; but with what truth it is difficult to say. Here is an example from a MS. written in 1664 by one Matthew Mackaile, apothecary in Aberdeen, as to an alleged instance in Orkney. 'I was very well informed that an eagle did take up a

swaddled child, a month old, which the mother had laid down until she went to the back of the peat stack at Honton Head, and carried it off to Choye, four miles, being discovered by a traveller who heard the lamentations of the mother; four men went presently thither in a boat, and, knowing the eagle's nest, found the child without any prejudice done to it.' To this may be added that this quotation is also given 'without prejudice.'

But the eagle did not always come off victorious; there is record of an instance where one was seen to strike a fish which proved too heavy for its strength, so that it disappeared into the depths. In a similar case the dead fish and dead eagle were both washed ashore; while a great halibut was once got, in whose back were still imbedded the feet of an eagle—telling their own tale.

This bird is known by a number of Gaelic names, as *Iolair-bhreac* (spotted eagle), *Iolair-cladaich* (shore eagle), *Iolair-bhuide* (yellow eagle), *Iolair-riabhach* (brindled eagle), *Iolair-na-mara* (sea eagle), and *Iolair-shuil na-greine* (eagle of sunlit eye). But the latter poetic name was most probably not meant to be descriptive of this species only; indeed, it is doubtful whether exact discrimination had always been

exercised by the ordinary observer, between the two resident British species. The name 'spotted eagle' at one time gave rise to a long and heated discussion as to the occurrence in Scotland of the true spotted eagle, *Aquila clanga*; a species that has occasionally, but very rarely, been recorded from England and Ireland, but up to now has not been found in Scotland.

It is sad, indeed, to find that this noble bird, so intimately associated with the wild headlands and cliffs of our West Highlands, is on the very verge of extinction—thanks to the greed of those who, for the sake of gain, pander to the desires of men who pride themselves on their collection of empty egg-shells.

BIRD-LIFE IN A WEST-HIGHLAND PARISH.

IX.

BIRD-LIFE IN A WEST-HIGHLAND PARISH.

ALTHOUGH general interest in the study of ornithology has greatly increased of late, a large proportion of the public have but little exact knowledge of the subject, and do not realise how rich our country is in its bird-life. Mr. Howard Saunders[1] gives 382 different species enumerated as recorded in our islands; and when we eliminate those rare visitors, of which fewer than six examples have been obtained,—some 74 in all,—there yet remain over 300 undoubted and distinct species; to which fall to be added those additional visitors that have been recorded during the last ten years. It may serve as some encouragement to those who are attracted by the charm which this study adds to country life or country holidays, to give shortly the results of observation and record during the last few years in a district on the shores of Loch Awe in Argyllshire.

[1] *List of British Birds*, 1899.

The area in question, from its very varied natural features, is favourable to such observation. Lofty mountains, their foot-hills sloping to a great fresh-water loch, natural woods and copses, bleak moorlands with their streams and marshes, cultivated ground to some small extent, and here and there the tended grounds and gardens of modern civilisation, afford congenial surroundings for many diverse species; and, as might be expected, they are here in very considerable variety. Within the limits of a wide-spreading Highland parish, no less than 101 species have been observed; and of these 42 have been found within an area of only one acre and a half, while 19 different species have nested within this latter very limited space. Nor must this be taken as the sum of our feathered neighbours; others are almost certainly yet to be noted, although up to now they have eluded absolute identification.

To begin with the king of them all, the golden eagle,—known in Gaelic as 'Fireun' 'true bird,' that is 'the bird' *par excellence*,—still nests within our area, but not apparently in increasing numbers, although unmolested. One reason for this may be the marked diminution in the number of the blue hares, which seem to be yearly scarcer. His congener, the sea eagle, is, alas!

a 'vanished bird'; it is sad to think that in all probability but one pair of these noble birds nested in 1910 within Great Britain; in view of the rapacity of the egg-collector, it would be unwise even to hint at the locality. It is pleasant, however, to note that that miniature eagle, the buzzard (no longer rightly to be termed the 'common' buzzard), reared its brood with us, as has been its custom for years past; and not far off the peregrine, in like manner, nested undisturbed. The raven, too, in spite of all persecution, still holds its ground; while the grey or hooded crows receive each autumn such large additions from the far north that their numbers show no reduction.

Some years ago an instance occurred here of the pairing of a grey or hooded crow with a black or carrion crow; a similar case was noted by the writer many years ago in an adjacent district; and the like has frequently been recorded from localities where these two crows appear to meet. It seems to confirm the view that the two forms are to be regarded rather as racially than specifically distinct. Rooks have their colony just on the border of our area; and the jackdaw, here as everywhere, is increasing to a degree that almost threatens a plague.

Strangely enough, the magpie is entirely

absent; but the discordant cry of his cousin, the jay, is still to be heard in one or two localities in the neighbourhood. It is surely a pity that so bright and cheerful an ornament of our woodlands as the jay should be ruthlessly persecuted. His penchant for the eggs of other birds must be admitted; but, as he confines himself almost entirely to wooded country, he is harmless to grouse and other game birds of the open; and wild-nesting pheasants are, in these days, really a negligible quantity. The starling here, as elsewhere, is a quickly increasing bird, and in reasonable numbers is to be regarded as beneficial from the quantity of noxious grubs and insects it consumes. One wonders whether these western starlings have spread to us from the immemorial colonies of the northern islands,—themselves most probably an over-spill from congested areas of Scandinavia,—or whether they are part of the invading armies of the south.

As the days lengthen on the approach of spring, the weird cries of the owls are nightly to be heard, answering each other, as it seems, across the loch. The tawny owl is here, as in most districts of Scotland, the commonest; but the long-eared owl and the barn owl are also resident, the latter selecting the ruined walls of

The Golden Eagle

what was once a royal hunting-seat as a congenial nesting place. It is a strange peculiarity of the owls that they commence incubation with the laying of the first egg; so that we may find a half-clad fledgling, a newly-hatched owlet and a new-laid egg in the nest at the same time.

Of game birds we have, in more or less plenty, all the usual species; chiefly perhaps the red grouse, claimed to be peculiar to the British Isles alone, but doubtless a very near relative of the Scandinavian willow grouse, if not indeed merely a varietal form; one cannot but suspect a common ancestry. On the bleak tops of the highest hills the ptarmigan make their home—surely the hardiest of all our birds.

What is the explanation of the initial 'p' in our writing of this word? The Gaelic name—Scottish and Irish—is 'Tarmachan'; and the addition appears to be, in one sense of the word, impertinent.

The black grouse find entirely congenial surroundings in the birch-covered slopes and glens, and the giant of the tribe, the capercaillie, reappeared of late in the only locality where there are pine woods sufficient for his needs. This noble bird, as most people know, was at one time extinct in Scotland, having finally disappeared about 1760, but was reintroduced by

the Lord Breadalbane of the day in 1837; a full account of this, and of its subsequent spreading over a large part of Scotland, is to be found in an interesting monograph[1] by J. A. Harvie-Brown. Partridges are naturally scarce in such surroundings, but a few find a scanty subsistence in the little plots of cultivated land.

As elsewhere throughout the country, the woodcock is here a resident nesting and increasing species. Half a century ago a woodcock's nest was a rarity to be chronicled as a notable find; to-day they nest throughout Scotland in hundreds. When disturbed, the parent birds remove their young; and if the intruder is fortunate enough to witness this, he will see that the chick is carried neither in the bill nor in the claws, but between the thighs of the parent. In the twilight hours of the long summer days the woodcocks may be seen and heard each evening as they fly past in somewhat owl-like flight, uttering at intervals two curious sounds, one a harsh croak, several times repeated, the other more of a sibilant and piping nature. This evening flight is termed their 'rôding.'

During these same warm summer nights

[1] *The Capercaillie in Scotland*; David Douglas, 1879.

another strange sound is often heard on our hill-sides, a curious, long drawn-out, whirring or jarring sound, difficult to describe, but very like the noise made by drawing out the line on a stiff fishing-reel, or, as some say, like the sound of a spinning wheel. This is the night-jar or fern owl, also foolishly called the goat-sucker; needless to say that for this last name there is no ground whatever. It probably arose from the wide gape of the mouth, which, with its feathered fringe, is so admirably adapted for its purpose of catching moths and other night insects; yet, silly and misleading as is this name, it is surely extraordinary that it is still to-day its sole scientific designation—*Caprimulgus*. The claw of the middle toe is curiously serrated, for what purpose seems doubtful; but as this bird invariably perches lengthwise on a bough, and not across, possibly the saw-like edges render the hold more secure. A simple hollow in the ground serves it for a nest; and as soon as the young are ready for the long voyage, they leave our inhospitable climate for Africa. It is to be hoped that in these more enlightened days few gamekeepers continue to gibbet the 'night hawk,' as they used to call this pretty, harmless bird, among the criminals of their 'vermin larder.'

A still harsher evening sound is that of the landrail or corncrake, another summer visitor from Africa, which extends its journeys as far as the Arctic Circle in Scandinavia. When one considers the weak, laboured flight of this short-winged bird, one is filled with wonder at a range extending from thence to Natal. One seems driven to accept the theory that some inborn instinct teaches our migrants to ascend until a permanent atmospheric current of great velocity is reached to bear them on their perilous journey; a hint which is herewith gratuitously presented to those unfeathered bipeds who seek to emulate their flight. A near relative, the water-rail, also recorded in our area, is much less generally known, although widely distributed, occurring also in our Outer Islands. Its shy and skulking habits shield it from casual observation.

In the latter days of April the welcome call of the cuckoo is usually heard. The earliest date in the last fourteen years in this district was 21st April, 1898; the latest the 8th May, 1906. In 1909 they were first heard on 23rd April. As a rule, the cuckoo is very widely distributed all over the West Coast and the Islands. On two separate occasions the freshly-killed remains of cuckoos have been found here

on the hillside—that is, the feathers, legs and skulls—evidently the work of some bird of prey, most probably a sparrow-hawk, a somewhat rare bird with us; but an adult cuckoo is just about as large as a female sparrow-hawk.

Amongst the earliest harbingers of spring is the curlew, whose wild, mournful cry is heard towards the end of March, when the first-comers find their way from the nearer sea lochs to their solitary nesting-places on the foothills. Dry knolls and flats at some considerable elevation are generally selected, but they nest likewise in the larger islands of the loch, as Robert Gray tells us is also the case on Loch Lomond. With shortening days and scantier food supplies in autumn or early winter, they depart again to the sea coast.

Even more plaintive and mournful is the note of the golden plover, frequenting much the same localities. Those who are only acquainted with this beautiful bird in his winter dress will hardly recognise him when he has left the sea shore in his gay nuptial plumage. The sides of the head, the neck, breast and under parts, are all now black; the upper parts spangled with black, white and gold, and divided by a pure white line from the black beneath. After the breeding season all this

glossy black disappears, the bird being mottled all over, except that the under parts are now white. No such wonderful transformation takes place with its relative, the lapwing or peewit, which breed here in peace, as no one dreams of robbing them of their eggs. There are few more beautiful or graceful birds than this, with his contrasts of black with metallic green and purple sheen, white and chestnut, and curved crest or horn. Gray tells us that in the Lowlands there still exists a strong dislike on the part of the moorland folk to these poor birds, dating from the 'killing' days, when the Covenanters in hiding were sometimes betrayed in their wanderings by the continuous cries of the peewits, as is their custom when disturbed.

The thrush, here as elsewhere, is one of the first to welcome the lengthening days with his clear notes, but few remain over the winter, finding more congenial quarters on the neighbouring seaboard. Its congener, the missel-thrush, is more sparsely represented. This is a courageous bird, the sitting mother sometimes permitting itself to be stroked with the hand; while intruding jackdaws or even cats are chased away with angry scolding. The blackbird is one of our commonest species; unlike

the thrush they seem to receive considerable additions to their numbers in autumn.

Large flocks of fieldfares pass by on migration, arriving about the first week of November, passing again in spring to their northern breeding-places in Scandinavia and Russia, where, strangely enough, they nest in social colonies. There is, as yet, no record of their nesting in Great Britain, a somewhat remarkable fact, as they breed in many parts of Germany, of late in increasing numbers; so that quite possibly some may yet, sooner or later, remain here to nest. Some years ago I saw a large flock in Banffshire as late as the 6th of May. The redwing is a much less frequent visitor, and seems to be the very first to feel the pinch of cold and wintry weather. In the higher glens and straths the harsh 'chack-chack' of the ring ouzel is heard in April; but early in autumn they leave for southern Europe and the north of Africa.

One of our commonest birds is the familiar robin, notable for its quarrelsome habits, and as being one of the very few birds that sing even in winter. His cousin, the gentle hedge-sparrow, is much less common, and is usually found in the vicinity of human habitation. The redstart—here as elsewhere throughout

the country one of our rapidly-increasing birds —is surely also one of the handsomest. His pure white forehead, black throat and gorget, red breast and twinkling rusty tail-feathers, must catch the eye even of the least observant. Widespread over all Europe, it is found from Nubia and Senegal up to the Arctic Sea—with us, of course, a summer migrant. Another very beautiful bird, the stonechat, in whose nuptial plumage the same black, white and red are differently contrasted, is a resident species, but only sparsely distributed, as is also the case with its congener, the whinchat.

The wheatear is one of our earliest spring visitors, flitting along the roadsides with its familiar call-note. The natives of these parts believe that they winter in cairns or in the crevices of stone dykes; and have been known to be somewhat indignant if any doubt were cast upon the assertion that they themselves had found them thus hibernating; but, after all, Gilbert White himself had a shrewd suspicion that the swallows slept away the winter in some unknown hiding-place.

First of its family to arrive in spring is the willow warbler; should the weather be bleak and cold it may be with us for days unnoticed, for under these conditions its song will not be

heard. The white-throat finds its favourite nesting-place among the thick bramble-brakes and brackens, its loud, cheerful song continuing far into summer when most of our other birds are silent. The garden warbler is a recent addition to our local list, both it and the wood warbler having been identified by a trustworthy observer. The black cap has been but once recorded, and the chiffchaff is reported as having been identified by its call-note; but this latter requires more certain identification. Then, last of our warblers, comes the sedge warbler, whose cheerful song is often heard far into the summer night as it flits in spiral fashion from spray to spray of some alder-bush by the loch side, till, having perched on the topmost twig, it flutters singing upwards, and then drops to the foot again.

The tiny gold-crest, smallest of all our British birds, is often seen in little travelling flocks of various tits in spring and autumn; but some are always resident and nest with us, though sparsely. That such tiny mites can brave the storms and gales of the Northern seas and reach our coasts seems almost incredible,—but so it is. The graceful long-tailed tit is often their companion, and of these, too, a few pairs remain with us. The

great tit, the coal tit, and the blue tit are among our commonest birds, the last being here the least plentiful. He or she who wishes to do a kindly act, and at the same time provide an unfailing source of pleasure and amusement, can do so by hanging a half-picked bone, or preferably a lump of suet, by a short string to some convenient branch or projection. To the tits these are a great attraction, and their quaint postures as they cling upside down to the food, or slide down, the string clasped in their little claws, never cease to interest and amuse. A few well-designed and properly placed nesting-boxes will serve to attract and keep them.

Another tit, the marsh tit, has only once been recorded in this area as a stray autumn visitor. The water-ouzel frequents the hill burns and the loch side, and, like the robin, may be heard singing his cheerful little song in the ice and snow of winter. One pair chose an extraordinary nesting-place, building on the lower flange of an iron girder forming part of a culvert carrying the railway over a small burn. Here they sat and hatched their eggs within two feet of the rail on the upper side of the bridge over which a dozen noisy trains were passing daily. One would have thought that the vibration alone, to say nothing of the noise, would have deterred

them. Within a dozen yards of this culvert a pair of blue tits hatched their young in a hollow cast-iron gate-post of the railway crossing, regardless of the constant swinging of the wicket gate by passers-by.

The wren is another of our birds that faces cheerfully our severest winters. Their well-known habit of building several nests has led to the belief that many of these serve merely for winter shelters, and that those that are unlined with feathers belong to this category. Gray, however, mentions a series of six nests found by him which were all unlined with feathers, and yet all contained eggs. The wagtails, both the pied and grey, leave us in winter, the former being the first to return to the loch side in spring. The meadow-pipit, the familiar 'moss-cheeper,' is here as elsewhere doubtless the most common victim of the cuckoo's unwelcome attentions; a much rarer bird with us is the tree-pipit, a summer visitor that nests with us although but sparsely. The spotted fly-catcher too is only with us for a brief summer season; but the pretty little tree-creeper is content to stay, and may be seen in mid-winter creeping mouse-like in spirals up the stems of oak, birch and alder. The swift is naturally confined to those localities where there are buildings sufficiently lofty for

its requirements; the swallow, martin and sand martin are all common, flocks of the latter being often to be seen hawking for insects far out in the centre of the loch.

Perhaps the commonest of all our birds is the chaffinch, especially in winter, when large flocks of strangers come to stay with us. The alleged separation of the sexes of these birds in winter is a vexed question. First named *coelebs* or 'bachelor' by Linnaeus,[1] that great authority must surely have have had good warrant for so doing, at least so far as Sweden is concerned; but here with us there is no such division. Any day in winter flocks of sixty or more can be seen feeding under the windows, and at all times the sexes seem to be practically equally represented.

The greenfinch is a rare bird here, preferring more cultivated country; but each winter has of late brought us flocks of bramblings, many of which pass on, but some remain all winter, chiefly on a large well-wooded island. The sparrow, like the poor, we have always with us, but, up to now, careful search has failed to distinguish the tree-sparrow. The pretty little lesser redpoll is a common visitor in spring and autumn, and almost certainly nests with us, although it must be admitted that the nest has

[1] *Syst. Nat.* 1766.

not yet been found within our actual bounds. A large flock which stayed two days with us last autumn brought with them as companions some siskins, an interesting arrival as constituting what seems to be a first record for the faunal area. A charming resident which appears to be increasing with us is the bullfinch, although it is to be confessed that the gardeners have reason to give him a somewhat cold welcome. His Gaelic name is 'corcan-coille,' *i.e.* 'little bull of the wood,' corcan being the diminutive of corc, 'a fairy bull, a water-bull,' Here we have again the same idea as in our English bull-rush, bull-frog, bull-trout, to name only a few examples.

On the moor edges we find the twite or mountain linnet, conspicuous with his yellow bill, and in more cultivated districts the corn bunting and the yellow hammer, both somewhat infrequent; while by water side and alder copse the black-headed bunting is easily distinguishable in sombre head-dress and white cravat.

Now and again a passing flock of cross-bills have visited us. Most people know the touching legend of how this bird acquired his red-stained breast and twisted beak in striving to withdraw the cruel nails from the Cross. The skylark sings to us on our little golf course as he does to more favoured mortals in the Lothians, Fife or

Ayrshire; and the wood pigeon finds a safe asylum in the wooded islands of the loch.

Across the loch a wide-spreading bay, where a little wooded river flows in between gently sloping grassy banks, far from traffic or habitation, affords a pleasant spectacle on a fine spring day. Black, ugly cormorants will be there, lesser black-backed gulls with their harsh barking cry, common gulls in plenty, black-headed gulls, perhaps a herring-gull or two; one wonders that any trout remain at all. More rarely a heron may be seen, their nearest breeding-place an island in a far distant loch; but wild duck and wigeon one may expect to find; the last has now been ascertained to nest on the loch, thanks to the labours of an enthusiastic lady naturalist. In winter these are joined by pochard and goldeneye, the latter remaining often far into spring, and raising hopes that some day they too may remain to nest. Hollow trees, which form their favourite nesting-place, are at any rate here to hand. Pintail have been seen on a neighbouring hill-loch as late as June, and such hill-lochs are the favourites of the little teal. On the grassy shores the quaint red-beaked oyster-catchers catch the eye by their bright colouring, the redshank rises with its plaintive note, and the sandpiper runs questing along the margin.

On the thickly-wooded islands the merganser hatches the brood which afterwards she leads down the river, to the destruction of numberless salmon smolts and the disgust of the patient fisherman, as she splashes like a noisy steam launch down his favourite pool.

Far off in the heart of the deer forest, safe from intrusion and disturbance, the black-throated diver has found a secure asylum.

THE RECENT INCREASE AND DISPERSAL OF SOME BIRDS IN SCOTLAND.

X.

THE RECENT INCREASE AND DISPERSAL OF SOME BIRDS IN SCOTLAND.

Some birds that we know to have been at one time inhabitants of Scotland have entirely disappeared, as, for instance, the great bustard, not so long ago to be found on some of our great plains and commons, but now ousted by advancing population and cultivation. The sea eagle and the osprey are now practically extinct as nesting species; the first is a victim, in large measure, to the advent of Highland sheep farming; and both, in part at least, to the greed of the egg-collector and his tools.

On the other hand, we find some species increasing and advancing, at times in waves that one feels justified in terming phenomenal. It is some of these increasing species that are here considered.

These birds appear, on consideration, to fall

into three separate categories. We find that certain species that have always, so far as our knowledge extends, inhabited our country have greatly increased in number and extended their bounds. Others, again, that have been known as passing visitors only, have settled, as it were, with us and become resident and breeding species; yet others, formerly quite unknown, have suddenly appeared and multiplied exceedingly. Of the first category we may take the starling as a striking example.

This bird is to-day the ubiquitous inhabitant of every part of the country; and not of the country in the restricted sense of the term only, but of every village, town, and city as well. Yet those whose memories go back to the middle of the last century remember that the starling was then, comparatively, a rare and much-cherished bird. Nothing was more common than to see nesting-boxes hung on gables of houses or barns or on some adjacent trees, with a view to encourage them to take up their abode. Young starlings were eagerly sought after as pets, for which purpose the ease with which they can be tamed and their wonderful power of mimicry and even of articulation particularly recommend them.

At that time, when the bird was already

spreading over the south of Scotland, it was still quite unknown over the greater part of the centre and north; but to this there were very remarkable exceptions. There is unimpeachable evidence that the starling has been resident in numbers in Orkney and Shetland, in the Outer Hebrides and the extreme north of Caithness 'from time immemorial'; it may be noted, in proof of its long residence, that the Highlanders have for it their own Gaelic name 'Druid.'

The invasion of Scotland by the starling has been exhaustively treated by Mr. J. A. Harvie-Brown,[1] as also in his series of volumes on *The Vertebrate Fauna of Scotland.* The question of the actual causes of such dispersals is a large one, and it must suffice here to say that it seems probable that, as a rule, such movements are caused by pressure arising from congestion of numbers in the older centres; so that the superfluous population is forced to overflow and to find a passage along the lines that are to them those of 'least resistance.' Thus, while the advancing wave was pushed northward from England, the Outer Islands had probably received their quota long before, from the old-established colonies in Orkney and Shetland. Whence

[1] *Annals of Scottish Natural History*, January, 1895.

these latter got their first visitors we are left to guess. Very possibly the original colonists followed the same route as the Norsemen, for the starling is an old-established race in Scandinavia. A widely distributed species, it is found all over Europe and Northern Africa, and extends through Russia across the Urals to Eastern Siberia and throughout India; it may therefore well be that the ancient Northern colonies were originally peopled from the North and East where the centres had become congested by advancing waves from the Further East.

Towards autumn the starlings—a very gregarious folk—collect in huge flocks and fly nightly to their favourite roosting-places, where they congregate in such vast numbers as to become a positive nuisance, if not a danger, the ground beneath being polluted to an extent hardly credible if not experienced. Nor is it easy to drive them from such favoured spots; shooting has little effect on such uncountable numbers, and it is said that the only successful means of getting rid of them, short of cutting down the trees and shrubs in which they roost, is to keep up a continuous series of damp 'smudge' fires to windward of the place until they are fairly smoked out.

To what extent the starling, in such numbers, is beneficial or the reverse is a matter of some doubt. That they do a deal of good by the destruction of 'leather-jackets' and other noxious grubs and insects is certainly true; but they are an omnivorous race, and like their relatives, the rooks and jackdaws, seem to be acquiring new and unwelcome habits, robbing other birds of their eggs and young. Already in 1843 Yarrell records that they were accused of frequenting dove-cots and destroying both eggs and young, although he seems to have found the charge 'not proven.' Gray[1] relates that he had himself seen a starling drag five young sparrows from a nest and proceed to swallow them one after the other; if they confined themselves to sparrows perhaps they might be forgiven. I can recall that when the starling first began to appear in the Upper Ward of Lanarkshire, say in the 'sixties,' they were accused of destroying the eggs of the lark; and Dr. Saxby[2] records that he has known them to do so; and also once detected a pair in the act of devouring pigeons' eggs.

The starling has great powers of mimicry, and delights in imitating the songs and call-notes of other birds. It seems especially fond of repro-

[1] *Birds of the West of Scotland*, 1871. [2] *Birds of Shetland.*

ducing the cries of the curlew, oyster catcher, redshank and golden plover. One that some years ago had been brought up from the nest, and had learned to whistle correctly a bar or two of an air and to articulate a few words, including his own name, lived in an out-door aviary on friendly terms with the other birds, rabbits and squirrels. One day the door was inadvertently left ajar and Jacko escaped, flying to the tops of the lofty adjacent elms. When his master was summoned he was evidently enjoying the society of a chattering flock of wild starlings, and his capture seemed hopeless. Nevertheless, as soon as he heard the familiar strains of his little tune whistled to him, he left his new friends, descending in gentle spirals and lighting on his master's shoulder, and so permitted himself to be carried quietly once more to his home. Though a fearless bird as a rule, one day he got a terrible shock; a large white pigeon, which had turned up strayed and exhausted, having been introduced into the aviary. As soon as he saw this ghostly apparition he fled shrieking into the innermost recesses of the rabbits' hutch, burying himself in the hay with piteous exclamations of 'Poor Jacko! Poor Jacko!' The unsophisticated black man is said to regard a white man, when first he sees him, as

that being whom the Gael euphemistically terms 'Him whom I will not name'; and this, possibly, may be the explanation of the poor bird's terror.

The great spotted woodpecker appears to have been becoming extinct with us as a nesting species just about the time when the starling was first pushing its way into Southern Scotland, *i.e. circa* 1840-50. Previously it was a well-known and by no means uncommon bird in the North.[1] What was the cause of its virtual extinction in Scotland at that time remains a puzzle. The authority just cited seems to think that the greater care of the woodlands, involving the destruction of ancient and blasted tree-trunks, may have been a principal factor by restriction of their chief nesting and feeding localities. Be that as it may, we are to-day witnesses of the return of this species in some numbers in our southern and eastern counties. To mention localities is in such cases always unwise; but of late years there are increasing records of this bird nesting in several Scottish counties. Now it cannot be supposed that there have been any extraordinary changes in the way of suitable surroundings and facilities to induce such an immigration; ancient fir trees and neglected forests have not recently become more numerous.

[1] Harvie-Brown's *Fauna of the Moray Basin.*

We must fall back, therefore, on the theory that these newcomers have been pushed forward by reason of over-population and congestion in old-established centres.

The jackdaw is another bird that has been always with us, yet has recently increased in numbers to a remarkable extent, so much so as, in places, to constitute a nuisance. When the larger birds of prey were more numerous in the land they may have helped to keep the jackdaws within reasonable limits; but now they do not appear to have any enemies. The increase is so marked as to suggest pressure from outside sources.

A much more welcome visitor is the redstart, surely one of the most brilliant and striking of our summer migrants, and one that is certainly much more numerous than it used to be only a few decades ago. In the *Fauna of Moray*, Harvie-Brown describes their increasing dispersal as 'great waves,' and the writer recalls their occurrence at the altitude of 1200 feet in Spey-side. As suitable localities, such as old birchwoods, are filled up, the overplus press on in new directions. Much the same may be said of the garden warbler, doubtless also an advancing species, although one easily overlooked were it not for its striking song. The bullfinch, too,

is another whose increasing numbers would be more welcome, were his attentions to the buds of fruit-trees only a little more discriminating.

The fulmar is associated in the minds of most of us with the Island of St. Kilda, where they form an important part of the food supply of the inhabitants. Of late years, however, new colonies have been found established on Handa and the mainland, and there is evidence that in the old-established nursery at St. Kilda all available nesting places are fully occupied. It seems reasonable to conclude that some, at least, of the new colonies have been peopled by the pressure from this congested centre.

Very notable has been the rapid increase and dispersal of certain ducks as resident and breeding species, *e.g.* the tufted duck, shoveller, pintail and pochard. The most noticeable case is, perhaps, that of the tufted duck, the increase of which is certainly very striking. Loch Leven seems to have been the first centre where it established itself, and now it is very common in suitable localities in eastern and central Scotland. Along with the ducks may be mentioned the great crested grebe, formerly a rare visitor, but of late years nesting regularly and in increasing numbers with us.

Turning now to the second category men-

tioned above, that of birds formerly known only as passing visitors, but of late remaining as resident and nesting species, the most remarkable instance is that of the woodcock. This bird has been always, as far as we know, a regular visitor on migration, just as it still is in Germany and other parts of the continent of Europe; but to-day it is something more, being now fairly established as a breeding species all over Great Britain. Yet, to go back to the mid-Victorian era, a woodcock's nest was then a rarity indeed, hardly to be credited without ocular demonstration. Some forty years ago I remember seeing such a nest for the first time in central Perthshire, the motionless sitting bird hardly to be distinguished from the brown leaves and bracken around it save for its prominent bead-like eyes; at the same date they were found nesting yearly in the birch-copses round a sea loch in West Argyll. Now-a-days they nest, in all likelihood, in every county in Scotland, in favourable localities in considerable and increasing numbers. When Yarrell wrote, in 1843, although he mentioned as an incontrovertible fact that the woodcock did nest in Great Britain, he thought it necessary to cite particular instances in proof of it. The earliest date given by him was 1832, when four nests were found in Ross-shire, where

to-day nests may probably be counted by hundreds. It is interesting to note that already in 1832 the Ross-shire keepers had reported that, when disturbed, the old birds would carry away the young to safety in their claws; it is now known, however, that the young are clasped between the thighs of the parent bird, and not carried in the claws, much less under the throat, or even in the bill, as was the earlier belief.

On their first arrival on spring migration, when pairing, the woodcocks have a curious habit of issuing from covert after sunset, flying slowly with puffed-out plumage round the edges of woods and copses or down rides and open spaces, uttering from time to time two peculiar call-notes, one a harsh croak two or three times repeated, the other a sharp sibilant piping sound. It is stated, on the authority of Dr. Hoffman, that the latter note is common to both sexes, while the frog-like croak proceeds from the male alone. It is during this courting season that the German sportsmen procure their best bags, placing themselves towards evening in some open spot on a favourite route. To some of us it may seem a pity to take advantage of the poor birds' honeymoon, but it is perhaps hardly to be wondered at, seeing that in a few days all these visitors have left for their more

northern breeding places. In early summer, when the woodcocks have nested with us, the same evening flights again take place in the twilight, accompanied by the peculiar notes described above. This flight follows regular lines or routes, and is termed 'roding' or 'rôding,' a word of doubtful derivation not to be found in ordinary dictionaries. May it not simply mean 'roading,'—*i.e.* following the accustomed roads or lines of flight?

In considering the circumstances of this remarkable change of habit in the woodcock, as regards its remaining with us as a habitual nesting species, we do not find any striking change in localities or conditions to account for its altered habit. No doubt the woodcock is singularly sensitive to climatic conditions, and a continuance of severe and adverse seasons must necessarily govern their movements to some extent; but the only satisfying explanation of so great a change seems to be that the older breeding centres had become congested.

It now remains to consider the third category—that is, the case of birds formerly quite unknown but now becoming common and increasing, and of these the stock dove is an interesting and remarkable example. Referring once more to the middle of last century, and

indeed to a later date, we find that this bird was absolutely unknown in Scotland, although to be found, if somewhat sparsely, in certain localities in England. Dresser[1] quotes from a note in the *Ibis* of 1865, by Mr. A. G. More, as follows: 'The bird seems to be most numerous in some of the midland and eastern counties of England, and has not been observed in either Scotland or Ireland.' Gray[2] mentions the stock dove merely in an 'observation,' under the heading of the ring dove, as having been recorded from Caithness and once from Orkney, and seems to have been somewhat doubtful as to its identification. The phenomenal increase of these birds up to 1883 has been recorded by Mr. J. A. Harvie-Brown[3] and its subsequent stages in his volumes on the *Vertebrate Fauna of Moray and Tay Basins.* In the latter volume, p. 263, he says: 'At the present time the stock dove is a more abundant species than the former-time wood pigeon—at least so it is often reported to me by observant gamekeepers in my own district of central Scotland and by others who have frequent opportunities of making observations.'

[1] *Birds of Europe.* [2] *Birds of West of Scotland,* 1871.

[3] *Proceedings of the Royal Physical Society of Edinburgh* of that year.

The stock dove is now widely spread over all suitable areas of southern and eastern Scotland, extending well to the north-east, the wave of invasion having been in suddenness and volume quite phenomenal. It is interesting, therefore, to note that a German authority, Friderich,[1] states that it is becoming much less common in Germany, especially in localities where population and traffic have increased. If this is correct it is somewhat remarkable; for in its extension here it does not appear to exhibit any shyness or dislike to civilisation, having multiplied exceedingly in some of our most highly cultivated and populous districts. Nor can it be said that there is any change in this country to render it more inviting to this bird as a breeding habitat, for it nests by preference in hollow trees, whence its German name 'Hohl-Taube,' and there are not any increasing facilities here of that nature. Where such hollow trees are not forthcoming they nest readily in rabbit-holes or in hollows in rocks, or in thickly-tufted ivy-clumps. They take freely, too, to artificial nesting-boxes specially put up for them.

The stock dove is readily distinguished from the common wood pigeon, being of slenderer

[1] *Naturgeschichte der Deutschen Vögel*, 1891.

build and considerably smaller, measuring only some 13 inches in length as against 16 to 17 inches in the case of the latter. The white patch on the neck of the wood pigeon is entirely wanting, being replaced there by bright metallic green, nor is there any white on the wings. The call-note, too, is distinctly different, resembling somewhat that of the rock dove.

We have seen that in the case of the stock dove, as in that of the woodcock, there are no changes in the country, apparent to us, to account for its advent and stay; we come back, then, to the same conclusion, that we are witnessing the result of pressure from congested population, overflowing along the most natural and easy lines.

The whole subject of dispersal and distribution is full of interest and of difficulty. The mysteries of bird migration, their extraordinary journeys, the unfailing instinct that brings them yearly seeking an approach, as some believe, to their original place of origin, have a great fascination. These migrations appear to precede the settlement of new breeding stations; a process that has been going on throughout the centuries and in every department of the creation, and one of which, now and then, as in these instances, we catch a passing glimpse.

THE BIRDS' FREE BREAKFAST TABLE.

XI.

THE BIRDS' FREE BREAKFAST TABLE.

No winter passes without some period,—longer or shorter,—of storm or biting frost; and these tell with all the more severity on the feeble and more delicate of our birds from their unexpected suddenness. On such a wintry morning it is touching to see these little creatures showing in attitude and demeanour how the rigour of the weather is affecting them. The song-thrush is the very first to feel the influence of the cold blast, the iron ground impervious to its bill, and its prey safely ensconced deep below the frozen surface; even the hardy robin looks like a ball of fluff as he sits on a spray watching with bead-like eyes for some charitable dole. All nature seems tamed and subdued, the more shy and retiring of our birds throwing off their natural timidity and approaching our doors and windows under the stress of cold and hunger,

Such appeals find doubtless ready response

from many sympathisers, but it is to be feared that, with all goodwill and intentions, the willing helpers often fail to do as much as they wish in the way of relief to the little suppliants,—more from ignorance than from want of kindly feeling. A little thought and a very little trouble and care will go far in enhancing the value of such outdoor relief, and will bring a never-failing reward of interest and amusement. To scatter 'crumbs for the birds' is a common form of such benevolence, and is good as far as it goes,—but it does not go very far. Crumbs are no doubt better than nothing; but neither in substance nor in quantity, as usually doled out, will they avail much among a crowd of hungry birds of various species and natures.

It is not to be supposed that this matter of caring for our birds is one that concerns only those living in the country. Even those who dwell in our larger towns will, with few exceptions, find opportunities of the sort; for apart from the house sparrow, there are other birds, such as the starling, to be found in all but the most densely populated localities. As one moves further from these centres, open spaces, back yards and gardens and the like become more plentiful and so also will the bird life be found increasing until we reach the suburbs and out-

skirts, where quite a number of species can be noted as regular residents or visitors.

The first question to be considered is as to the food to be provided; something that will be both satisfying and nutritious and, as far as possible, generally suitable to the different species. Let the first item, then, of our free breakfast table consist of table scraps, of every sort; refuse bread softened and broken up, all morsels of meat, and especially of fat, being carefully preserved, chopped up small and added to it; then, to get bulk, a good proportion of 'thirds' meal should be rubbed with melted dripping into a crumbling mass, and the whole thoroughly mixed together with a good handful or two of hemp-seed added.

Where and how to serve the meal must depend on the locality. The town-dweller may have to rest contented with the window-sill, but where there is a yard, garden or lawn, a rough table can easily be arranged with a board raised on four posts driven into the ground, or a shelf fixed against a wall, as circumstances may suggest. But in every case such structure must be amply secured from marauding cats with wire netting and barbed wire.

Another and excellent plan consists of an inverted bottle supported by wire loops pro-

jecting from a wooden upright, with the mouth of the bottle reaching to about a quarter-inch above a little wooden board or plate at right angles to the upright, to the foot of which the plate is securely nailed. This apparatus is hung by means of a hole at the upper end of the upright batten on a nail in a tree-stem or wall. To use it, it is taken down from the nail, the bottle removed and filled with hemp-seed. The bottle is then returned through the loops, the upright being meantime inverted. When all is ready, the whole is quickly turned round and re-hung on its nail. The bottle being thus once more turned mouth downwards, a certain portion of hemp-seed will have fallen in a little heap on the plate and as this is devoured by the birds a further supply is always automatically descending, the main amount being meanwhile kept dry in any weather. It is, in fact, on just the same principle as some poultry fountains and feeding dishes. This method naturally benefits only the hard-billed or seed-eating birds.

Yet again another plan, and one that is most interesting and amusing, is to to suspend food of a suitable nature by a cord from a tree-branch or some such object. A lump of tough fat, such as a piece of bacon-rind, is perhaps best

and most appreciated; but bones of any sort,—if appearances are not considered—will answer well. Such morsels are the especial delight of the tits, the great tit, blue tit, and coal tit, who will quickly find them out and afford endless amusement by their quaint ways, hanging head downwards or sometimes grasping the string with their tiny claws and letting themselves slide down to the food. The chaffinches are not nearly so clever as a rule, although one sometimes sees an exception; but usually they flutter opposite it, taking a hasty peck with more or less success; the blackbirds are still more clumsy, although sometimes managing to secure a morsel while fluttering past.

The three methods mentioned above may all be used together, when there is space and opportunity, and the pleasure and interest is greatly enhanced by keeping the different arrangements near to and within sight of the windows of the living-rooms. The mixed food should not be made very wet, or in frosty weather it will soon be frozen solid; it should be put out while still warm, although not hot. Unless there is a constant supply of running water near, it is well to place some shallow vessel of water close at hand; a flower-pot saucer will answer admirably. This must be

often refilled in case of frost. The birds very soon learn to recognise any signal such as a bell, whistle or the clattering of a spoon on the food-dish, and will be seen hastening in flocks from quite a distance as soon as the first sound is heard.

In a suitable locality it will probably be a surprise to the novice to find what a number of different birds will be attracted. In the case of the writer, in a West Highland parish, no less than twenty-one different species have at one time or other come to be fed in the immediate vicinity of the house; some of these, as, for instance, the brambling and the redwing, are only to be looked for in the stress of a hard winter. Now and then some rarity will put in an appearance, as when a marsh tit stayed for several days, and was doubly interesting in that it constituted a first record of the species for the county. All through the winter, however, some eight to ten different species may be seen daily, and often in considerable numbers; as many as sixty chaffinches have been counted at one time within a space of a few yards square. In a more highly cultivated district, the number of varieties would doubtless be greater.

To encourage birds to remain with us, the principal thing one can do, besides affording

them protection and quiet, is to provide for them nesting facilities. A certain number of birds, such as the different tits, for instance, build in holes in trees, or in similar situations; and their wants are easily supplied by hanging up suitable nesting-boxes. They are not at all disposed, however, to accept each and every box that may be offered to them, having their own views on the subject. The box must be of the proper size and form, so as not to require too much nesting material, and should have the proper aspect and be protected from wind and drifting rain.

This is now, however, made easy for us by the enterprise of the thorough-going Germans, who have long ago appreciated at its proper value the part that birds play in forestry and agriculture. The Board of Agriculture of Prussia has experimented largely with such nesting-boxes. At one station we read of 2,000 boxes being hung up, at another 2,100, while in the Grand Duchy of Hesse some 9,300 were used, and by the second year all occupied. These statements are taken from a little book entitled *How to Attract and Protect Wild Birds*,[1] which is cordially recommended to all interested in the subject. In it will be found fully related the

[1] London: Witherby & Co., High Holborn.

experiences of Baron von Berlepsch of Seebach, in Thuringia, who has studied the question for years, and carried out experiments on a grand scale with great success. In this little volume will be found full descriptions, with drawings and photographs of the boxes that have been found to be really successful.

Their use in Germany being on so great a scale, regular factories have been established for their manufacture on a commercial basis, and these boxes are now to be obtained in London at very moderate prices. They are hollowed to the proper depth and shape out of little logs of wood with the natural bark left on, fitted with a strong oak cover screwed on to the top, and bolted with iron bolts to a hard-wood batten which has holes reinforced with iron plates to take the special nails supplied for hanging them with. They are made in different sizes, according to the birds for whose use they are intended. The most useful size for ordinary use in this country is the 'A'; and all of these boxes are supplied by the Royal Society for the Protection of Birds, 23 Queen Anne's Gate, London, S.W., for the sum of 1s. 6d. to 2s., according to the size. The boxes themselves are so strongly made that they can be safely sent by rail without any

packing. Care should be taken in hanging up the boxes to follow exactly the directions given in the paper which may be obtained from the secretary of the Society, and it may be further noted that these boxes are made with two different-sized entrance holes, the smaller one only admitting the smaller tits (the blue and the coal tits), and not the great tit or the house sparrow, who are apt to monopolise them and drive away the others; thus it may be well to try both of these.

BIRDS AND THEIR CHANGING HABITS.

XII.

BIRDS AND THEIR CHANGING HABITS.

THE wood pigeon or ring dove is usually and rightly looked upon as a bird of a shy and retiring nature, an inhabitant of woods and forests, although no doubt frequenting more cultivated areas in search of food, of which, by the way, it seems to require an extraordinary amount in proportion to its size. All sportsmen are well aware of its vigilance and alertness, of its keen sight and distrust of man in its normal state. It is true that in the nesting season individual pairs sometimes throw off this natural shyness, and are found nesting in close proximity to dwelling-houses, where they have found themselves unmolested; yet one would have thought the wood pigeon one of the last birds to become a dweller in cities and the busy haunts of man. Such, however, is the case; for the last two or three years the wood pigeon has become an ever-increasing resident and nesting species in

the parks and more open spaces of London; and, strange to say, there are well-authenticated instances of this whilom retiring bird nesting within the busy precincts of the city itself.

This extraordinary change of habit is also found elsewhere. The German ornithologist, Friderich, relates that, in 1879, he noticed a wood pigeon consorting regularly with tame pigeons in the town of Stuttgart; that in the North Frisian Islands and in Schleswig-Holstein they were coming 'more and more' into the gardens and suburbs, having apparently lost their fear of man; and that in various towns of the Netherlands, such as Amsterdam, Rotterdam, Leyden, and Leuwarden, the same change was noticeable, as they nested there in the trees surrounding the canals in considerable numbers.

Another addition, in recent times, to the bird-life of London is the so-called black-headed gull; in passing, one may note this persistent misnomer, the head of the bird, when in nuptial plumage, being of a rich brown or chocolate colour, and by no means black. Large flocks of these gulls frequent, of late years, the Thames and the ornamental waters of the parks every winter, although formerly seldom, if ever, to be seen there. Sir Herbert Maxwell accounts for

this change as having commenced at the time of the great frost of the winter of 1895.[1] It is to be noted, however, that a German observer, Walters, records that some of this species, together with common gulls, frequented the River Spree at Berlin in the winter of 1879-80, remaining there until the middle of the following April. This is evidently mentioned as a new departure; and it would be interesting to know whether this visitation has become permanent.

An increasing tendency has recently been observed on the part of gulls to feed on grain, several instances having been recorded to this effect, especially from the Lothians, where they have been found to be acquiring the habit of attacking the ripe grain in the stooks, which seems entirely at variance with their natural and accustomed habits. In course of time we shall be able to see whether this change is an increasing one, as is, indeed, very probable; for such divagations of habit appear often to be infectious.

Much has been written as to the rook, whether this bird is to be considered a benefactor to the farming interests, or whether its depredations outweigh the good it does by the destruction of noxious grubs and insects. I would suggest

[1] *Memories of the Months*, 5th series.

that here, as elsewhere, the truth may lie between the two extremes, and that the facts of numbers, locality and opportunity must all be considered. In undue numbers rooks, like other birds and beasts, may well become a plague, and all the more when there is no natural enemy left but man to keep their numbers in check. It is, however, no longer the farmer alone who complains of the damage done by rooks; the sportsman and the game-keeper have awakened to the fact that these birds have, comparatively recently, developed a new and vicious taste for the eggs and even the young of our game and other birds. This is particularly the case when a long period of cold and arid easterly winds, coinciding with the breeding season, has seriously diminished the natural food supply just when the demands of the young rooks are most clamant; and the bad habit, once established, unfortunately remains even when the original predisposing cause no longer exists.

In the Report of the Committee appointed by the Board of Agriculture to enquire into the great plague of voles which occurred in 1888-90 there is an interesting note in the evidence of a well-known naturalist, the late Mr. Robert Service of Maxwelltown, who drew attention to

the change in the habits of rooks during the ten years prior to 1892 as having 'developed most marked carnivorous habits, taking eggs, young birds, young poultry, young hares and rabbits to an extent they never did before.' In his evidence Mr. Service also stated that: 'By far the most effective among the bird and animal enemies of the voles is the common rook'; a fact that should be carefully noted by farmers when weighing the evidence, pro and con, as to the benefit or damage due to the rook from the agriculturists' point of view.

In this connection a very singular, and one thinks, suggestive fact emerges. Young nestling rooks have, as is well known, their faces feathered down to the base of the bill, as is the case with the carrion crow at all ages; these feathers being lost in the case of the rook in a couple of months, leaving the part bare. Of late years, however, there are many instances on record of rooks retaining the feathered mask for twelve months or more; and not only is this the case, but the beak itself shows in these instances a tendency to the more heavily curved type found in the carrion crow. This is a change of outward form as well as of habit; or, shall we say, a reversion? The loss of feathers at the base of the beak in the rook has usually been attributed to abrasion

in the soil in the search for food; but Mr. Service in his evidence states that, in his opinion, it results from moulting and not from abrasion.

Much the same story may be told of the starling. The phenomenal increase of this species within living memory is well known, and for long they were regarded as an entirely useful race, destroying, as they doubtless do, vast quantities of 'leather jackets' and other mischievous grubs and insects. They, too, have acquired new and unwelcome habits and tastes, robbing the eggs and young of other birds.

The bullfinch, a beautiful and interesting bird that may certainly be included among those species that are rapidly increasing in number and extending their range, has always been looked upon as of a somewhat shy and retiring nature, more especially at their nesting time, when their well-known call-note is much less frequently heard, and they themselves appear as a rule to avoid observation, creeping in and under copse and bushes rather than flying openly among them as was earlier their wont.

Personal observation, however, detects a seeming change, among some individuals at least. Two years ago a pair built and hatched their young in a low bush not twelve yards from a window of my house. Last spring a pair—

whether the same or not one cannot tell—showed themselves yet more confiding, building their nest and bringing off their brood in the ivy on the wall close to the front door of the house, the nest being not four feet from a bedroom window. It was a quaint and novel sight to see the cock in all his marital splendour of colouring perched on the roof, or on the gutter after the manner of the common sparrow.

To the instances given above many additions might doubtless be made, as, for example, a case recently brought to my notice where a family of jays were seen following the example of the sea-gull already mentioned, and feeding on the corn-stooks in a field adjacent to the wood where they had been hatched. Or, leaving birds for the moment, one might instance the squirrel, which, like some of the birds we have been considering, has recently been found to be morally on a down-grade and, in the case of individuals at least, acquiring a new and unworthy habit of robbing small birds' nests of their eggs and young.

BIRDS' NESTS AND NESTING WAYS.

XIII.

BIRDS' NESTS AND NESTING WAYS.

In the study of the nests and nesting habits of birds, we find that they divide themselves naturally into certain categories as resulting from the different sites they choose for their nests. A large number, as we know, build in trees, high or low, or in bushes, others on the ground, or very near it; some few seek the habitations of man. Another large class build in holes in trees, natural or excavated by themselves, on crags and rocks, in crevices of any kind. Others, again, build on or near water; some utilise the old nests abandoned by previous owners, many make no real nest at all. One species, fortunately unique, not only takes felonious possession of the nests of others, but adds insult to injury by handing on to them as well the weighty burden of the brooding and upbringing of the usurper's progeny, and this, too, at the expense of their own innocent families.

Probably the most familiar instance of birds nesting in high trees is that of the rooks, a gregarious race, living in large colonies, and preferably near human habitations. Their nest is a crude structure of sticks and twigs, which they bite off with their powerful beaks, with some coarse lining of grass or the like. Their congeners, the carrion crow and hooded crow, on the contrary, nest in single pairs in trees or on cliffs and crags, and generally use some wool in the lining. The magpie, which also prefers solitude, strikes out a line for itself, building a large structure strongly domed and covered with thorns, generally at a considerable height; possibly a guilty conscience causes it to fear reprisals. The jackdaw is to be found in larger or smaller colonies, nesting in hollow trees, or in holes and crevices in cliffs, or in ruins, or in church steeples; often, too, as many of us have experienced, in house chimneys.

A distinct type of nest is that of the wood pigeon, a mere platform of sticks and twigs, so sparse that often the eggs may be seen through the bottom; and yet, although so fragile in appearance, it seems to resist successfully the wildest storms.

Would that we might still number that noble bird, the osprey, among our native tree-building

birds. A generation ago its nest might still have been found on some tall pine overlooking the waters of a Highland loch; but the greed of the egg-collector has robbed these scenes of one of their greatest charms. About the most unlikely bird, one would have thought, to choose high trees for its breeding-site, is the heron, and certainly they look somewhat quaint and out-of-place, with their long bare legs, perched on some lofty tree; yet such is the usual situation for their colonies, although, when suitable trees are wanting, as in our more northern districts, they are to be found building in stunted birches or hollies, on ivy-clad rocks, or even on the heather-clad cliffs. Occasionally, too, although usually gregarious, a single nest is to be found. I well remember such a solitary example on a single tree growing by the side of one of our western salt-water lochs.

Another fine bird that, like the osprey, was not so long ago common throughout Scotland, is now no longer to be found on our side of the border. The kite or 'gled' builds its large and conspicuous nest usually on a tall and inaccessible tree, and is remarkable for a very singular and unaccountable habit; for invariably in the lining of the nest will be found rags and tatters of human clothing, paper and the like, acquired

no doubt from the nearest farmyard rubbish heap. Robert Gray[1] describes a nest near Loch Lomond, some fifty years ago, as suggesting that 'the bird had robbed some gaberlunzie of his wardrobe,—a pair of ragged trousers, worn stockings, and part of an old shirt, being among the articles.'

The kite has little fear of man, and his constant raids on the poultry yards doubtless brought about his destruction. To-day a small remnant still exists, carefully preserved and cherished, in a certain district of Wales.

Of all our British birds the chaffinch is pre-eminent as the architect of the most beautiful and artistic of nests. Placed, as a rule, at a height intermediate between the higher and the lower building species, the nest is usually so alike to its immediate surroundings as to be easily overlooked. The moss, grass stems and rootlets are deftly interwoven, felted together with spiders' webs, and delicately lined with wool feathers, hair and such like soft materials; the outer walls spangled with lichens and mosses, the whole so beautifully rounded as to suggest the turning-lathe or potter's wheel rather than the unaided efforts of the tiny builder. Sometimes one finds exceptions to the general rule, as in

[1] *Birds of the West of Scotland.*

an example where the whole outer nest was studded closely over with small pieces of white paper, making it a somewhat conspicuous object.

Another nest, hardly less beautiful, is that of the goldfinch, now unfortunately a rare bird with us. This is usually placed much higher than that of the chaffinch and so is difficult to find, is lined with wool and hair, but seldom or never with feathers.

Of a totally different nature are the dome-shaped nests, of which that of the water ouzel may be taken as an example. One of our earliest nesting species, the site is preferably in a rocky hollow or crevice, often so close to some little cascade as to be ever damp from the spray. A large structure for the size of the bird, the chief material used by it is moss, with grass stems, roots, and, in many instances at least, withered, hard wood leaves. Unless the nest is sufficiently covered by the nature of the cavity, the whole is domed and roofed over. Sometimes the site is such that the bird has to pass and repass through spray and falling water to reach the nest. The piers and arches of bridges are also in some cases utilised. Another curious instance is recorded by the late E. R. Alston, as quoted in Dresser's *Birds of Europe*: 'Sometimes the dipper shows unwonted bold-

ness in its choice of an abode. I have known a pair to build in a hole in a wall to which they could only gain access by darting between the revolving spokes of a mill wheel.'

The wren is another well-known dome-building bird, choosing often the overhanging brows of burns or banks or quarries, crevices in rocks, ivy-clad walls and such-like well-protected places. They use a great variety of material, restricting themselves, however, mainly to one substance in each case; one nest, for instance, will be chiefly composed of oak leaves, another of moss, and so on. Many are lined with feathers, others are unlined; it has therefore been sometimes held that the latter were merely sleeping places, or winter houses; but Gray[1] says that of six examples examined by him, and all without feathers, each contained eggs. It is nevertheless evident, from the number of nests found in a restricted area, that some are built and used for residential purposes only.

The most artistic and beautiful of the dome nests is doubtless that of the long-tailed tit. Firmly fixed to the branch of a tree, or in the middle of some thick bush, it is closely woven or felted together, the moss and other material made dense and secure with wool and spiders'

[1] *Birds of the West of Scotland.*

webs, only a small hole left on one side of the oval-shaped nest for ingress; the whole studded with lichens and bark scales so as to match the immediate surroundings. It is somewhat unaccountable why this lovely little creature should, alone of all its congeners, build a nest that to us seems singularly inconvenient in view of its long tail, but so it is. The nest is loosely and warmly lined with a great amount of feathers.

Of birds that build in holes in trees, the wood-peckers select one with some portion sufficiently decayed, and excavate their own retreat with their powerful beaks, the chips below often betraying the locality. One species of this interesting family has of late years begun to return to its old haunts north of the Tweed, and it is earnestly to be hoped that those who are fortunate enough to find them nesting will refrain from giving any hint, however vague, as to the locality in the public press; for such serves merely to bring down on them the egg-collector and his hungry gang.

A natural hollow in a tree serves often for the nest of the tawny owl, although it frequently uses an old nest of rook or crow, as is the constant habit of the long-eared owl. The white or barn owl is more apt to select church

steeples, ivy-clad ruins or crags, although occasionally using tree holes also. These latter are not what one would expect to be the natural breeding-place of any pigeon; yet the stock dove builds by preference in hollow trees, although at times making shift with rabbit burrows when nothing more suitable is handy. Still less, however, would one suspect a duck of such a choice; nevertheless the golden-eye nests regularly in hollow trees and often at some considerable height. That gaudily-coloured bird, the sheldrake, on the other hand, lays its eggs in rabbit burrows, sometimes even, we are told on the authority of Dresser, in the earths of fox or badger, and that, too, notwithstanding the presence of the original tenant; yet this is stated also by several foreign authorities, who add that no disturbance of peaceful relations appears to follow.

Of the smaller birds that habitually nest in holes, whether of trees, walls or the like, the great tit, coal tit, blue tit and marsh tit are all familiar examples; and like other birds with similar habits, are ready to take up their abode in suitable nesting-boxes when these are provided for them.

As all know, several species of birds find in and about our own houses convenient breed-

Lesser Terns

ing places. The house sparrow is the most familiar example, together with the house martin and the swallow; the swift is found nesting under our eaves, as also the starling, while the jackdaw too often takes possession of a disused chimney.

Rocks, cliffs and crags claim quite a number of nesting species. The golden eagle will occur to all as a chief instance; the sea eagle or erne, alas, has joined the osprey and is now nought but a memory. The noble peregrine, however, still holds its place, like the harmless, useful buzzard; and of sea fowl of all sorts, cormorants, shags, gannet, guillemots, gulls and others, it were tedious to make an inventory.

Coming now to such as build on the ground itself, it seems strange to find a falcon with such modest habit; yet the merlin, a true little falcon, is content to build its nest among the heather alongside of the grouse, plover and snipe, of whom, one fears, he is hardly a kindly neighbour. Nor does the same moorland heather-bush suggest itself as the most likely nesting-site for any owl; yet it is there that we shall often find the home and nursery of the short-eared owl, not an uncommon breeding species with us north of Tweed.

Our game-birds all nest on the ground,

although naturally in different localities and surroundings, from the capercaillie and the woodcock in the woods to the ptarmigan among the grey lichen-covered boulders of the hill-tops. Of lesser birds too, a great host; man's familiar friend the robin, the tiny willow-warbler, the wheatear, wagtails, pipits, yellow-hammer, to name only a few that first suggest themselves.

As has been said above, some birds are apt to take advantage of the deserted nests of others. Sometimes, indeed, do not await desertion, but take possession *vi et armis*; as in the common instance of the house sparrow and the martin. The kestrel will at times be found in possession of an old nest, so too the owls, especially the long-eared owl; a squirrel's drey is sometimes selected, or the nest of crow or magpie.

Still to be considered are those that live and nest on or near to water. The ducks furnish their nest with a warm lining of down from their own breasts, with which they cover carefully their eggs when leaving them; a microscopic examination of these various downs tells the secret of the species to the expert, should the parent bird have escaped unseen. The coot makes a great pile of reed-stalks that can rise and fall to some extent with the varying height

of the water. The water-hen's nest is somewhat similar, but is usually placed among the rank grasses and herbage at the water's edge. The sandpiper's is generally not very far from the water, although in a recent instance one built more than one hundred yards from the loch side, with a high road and a railway intervening.

THE CUCKOO.

XIV.

THE CUCKOO.

It is probable that no bird has excited more general interest among all peoples and in all ages than the common cuckoo,—so-called to distinguish our familiar European species from others of its family. Folk-tales and stories, poetry and superstition, in all tongues testify unmistakably to the hold that it has taken on the popular imagination; nor is this to be wondered at when its remarkable life-story is considered. The musical and distinctive call-note which heralds its arrival at its breeding stations coincides with the long looked-for approach of summer, and has given to it its name in the language of practically every country which it visits. In German *Kukuk*, French *coucou*, Dutch *koekoek*, Gaelic *cubhag* or *cu'ag*, Latin *cuculus*, Greek κόκκυξ, Sanskrit *koka*; these are only some of the instances that might be mentioned. Our Scottish name of *gowk* may possibly be derived from the Gaelic, but

is also evidently near akin to the German 'Gauch,' a popular alternative to 'Kukuk.'

As may be gathered from this incomplete list of names, the cuckoo is very widely distributed, extending in its European range to the Arctic circle, and in Asia as far east as Japan. It is common in some parts of India, is recorded from Arabia, Egypt and Nubia, and is said to penetrate as far as South Africa.

With us in Scotland, the cuckoo is to be looked for in ordinary seasons towards the end of April. The earliest date in a series extending over a considerable number of years in the West of Scotland was the 21st April (1898), and the latest the 8th May (1906 and 1910). Such dates, however, are merely approximate, as being those on which the bird was first heard—not seen. They may well have been with us for days previously, as uncongenial weather or scanty food supplies would keep them silent.

The cuckoo is a retiring bird, and is much more frequently heard than seen, especially the male, whose is the well-known call-note. When uttering this he is generally sitting concealed in thick foliage, and in doing so he drops his wings, raising the tail and bowing his head;

but he also sometimes calls in flight, especially when pursuing the female.

When flying, the cuckoo strongly resembles our smaller birds of prey. The slate-coloured upper parts with the strongly barred light-coloured lower parts, the long wings and tail and well-feathered legs of the bird in its more ordinary plumage, are markedly suggestive of the sparrow-hawk. The younger females, however, are often very differently coloured, the slate and ash colour being replaced by a more or less rufous brown, and this again gives them a striking resemblance to the kestrel. This rufous plumage frequently persists even after the first and subsequent moults, so that earlier observers were inclined to suspect a specific difference, and named it *C. hepaticus*; but further investigation proved this to be erroneous. This resemblance to our lesser birds of prey appears to be sufficient to deceive the little birds of various sorts that may often be seen following and mobbing the cuckoo, as if taking it for one of their natural enemies.

The male cuckoo, on arrival at its chosen summer quarters, selects for himself a certain locality or district, which it defends strenuously against all comers of his own sex. The females, which are said to be proportionately much fewer

in number, move through wider bounds, making their presence known by their peculiar call-note, a chattering or laughing sound of invitation; it must be admitted that they practise polyandry. As all know, it builds no nest, but is a parasite pure and simple, foisting all the natural duties and labours of a parent on to the shoulders of its innocent little neighbours, and this, too, at the expense of their own broods; for it must be remembered that for every young cuckoo raised to maturity a whole family of its foster-brethren are doomed to destruction.

The foster-parents selected by the female cuckoo belong, as a rule, to the various smaller insect-eating birds, such as the tit-lark, hedge-sparrow, redbreast, the wagtails, warblers and the like, the tit-lark or meadow-pipit being with us probably the most frequent victim. It is evident that the nest must be found and noted by the female cuckoo beforehand; and it must be owing to default in this respect that now and again the egg of the cuckoo is found in most unlikely and unsuitable nests, as, for instance, those of the stock dove, jay, and even of the little grebe. Such can only have been made use of in the last extremity. When the nest selected is sufficiently open and large, the egg is laid in the usual way; but in the case, fre-

quently occurring, when the nest is domed or covered, the egg is laid on the ground and then taken up by the mother in its beak and placed in the nest. The egg is remarkably small for the size of the bird, no bigger than a sparrow's, although the parent is much more than twice as large. They vary a good deal in colour, are mostly of a greyish ground, slightly blotched or speckled with darker shades. Dresser, who, in his *Birds of Europe*, has brought together the observations and theories of all the best authorities both of this country and of the Continent, describes a fine collection of eggs, many of which were blue, some uniform, some spotted.

A theory has been advanced that the cuckoo seeks a nest, the eggs of which resemble those which she herself lays. Newton appears to have held that it is a case of heredity,—that the cuckoo seeks for a nest of the same species as that in which it had itself been hatched. Dresser, however, makes the shrewd comment that such heredity could not well depend on the female alone, but also on the male, or, in the case of the cuckoo, probably on several males. The latter authority indeed rather disposes of the whole contention by his statement that in his own large collection of cuckoo's eggs less

than a sixth of them resemble those of the foster-parent.

It was formerly held that the cuckoo contented itself with depositing its egg, and took no further part in the matter. It is now alleged that, if the nest already contains eggs, she will throw out some or all of them, and has even been known to devour them. This latter statement is denied by some, but Dresser quotes Sachse as an eyewitness to the fact. The period of incubation is the same as that of most of the foster parents, and it is stated by some writers that the cuckoo, drawn by an extraordinary instinct, returns to the nest exactly at the time of hatching, throwing out of the nest all young birds and eggs other than her own that she finds therein. Whether this is or is not sometimes the case, it is certainly not universal; for often, as all know, some of the brood remain, the last act of the tragedy being carried out by the young cuckoo itself. Growing with extraordinary quickness, it is already, after two days, much larger and stronger than its unfortunate foster-brethren. With restless and untiring energy it wriggles itself backward under its neighbour until it has got it perched in a peculiar shovel-like hollow in its back, and then, with great exertion, raises it to the edge of the

nest and topples it over ; nor does it rest until it is the sole inhabitant of the structure. This action of the young cuckoo seems to have been first recorded by the famous Dr. Jenner, who, according to Yarrell, was asked to investigate the subject by John Hunter, and published the result in the *Transactions of the Royal Society* for 1788.

The food of the cuckoo consists of insects of all sorts, and largely of caterpillars, grubs and the like. It seems to be especially fond of the hairy caterpillars sometimes called 'woolly bears,' the gizzard having been found covered with these hairs adhering to it by their points. It must, therefore, be considered to be a useful species, although it doubtless causes many broods of our little birds to come to naught.

It is a puzzling and probably an unanswerable question as to the 'reason why' of this strange habit of the cuckoo. It is known to lay its eggs only at an interval of several days, and some hold that this may explain the necessity of the parasitical habit, as it would be a matter of weeks before all the clutch were laid and ready for incubation ; but this is also the case with some of the owls, where one finds a half-fledged nestling, an egg ready to hatch and one new laid all in the same nest, and yet they have

no difficulty in carrying out the ordinary duties of incubation and rearing of their brood. Such is also the case with the American yellow-billed cuckoo, which builds its own nest and rears its own young; yet Yarrell states, on the authority of Audubon, that this bird also lays its eggs at considerable intervals, so that eggs and young at different stages of development are found together. Like our own species it is a migrant, and Pennant tells us that it arrives in New York in May, makes its nest in June, and retires from North America in autumn.

In summing up the evidence, there does not appear to be good ground for the theory that the cuckoo seeks intentionally the nests of species whose eggs resemble her own; one of the best German observers, A. Walters, having compared no less than 214 cuckoo's eggs with those of their foster-parents, with the result that in only some six cases was there a strong resemblance, while the great number bore no resemblance whatever. As to whether the mother cuckoo returns to the nest at hatching time to turn out the eggs of the foster-parents, the evidence seems in favour of the view that sometimes, at least, she does so; while on the question of her devouring such eggs, Sachse has proved that such has occurred, although

the cases may be, and probably are, exceptional.

It is interesting to note that the parasitical methods of the European cuckoo are not unique, but are reproduced in almost every feature in the case of a small American bird, the cow-bunting, cow-bird or cow-pen bird. Wilson, in his *American Ornithology*, gives a long and interesting account of this bird. Like our cuckoos they do not pair, nor do they build any nest, but deposit their eggs in the nests of other birds, just as does our cuckoo, and never more than one in each nest. If Wilson is correct, the cow-bird's egg hatches in a shorter time than those of the selected foster-parents, and shortly after it is hatched, the eggs of the original owners all disappear. Here the resemblance to the cuckoo story ceases, for with the removal of the eggs the young cow-bird has nothing to do. Nor is there any evidence that the cow-bird parent ever revisits the nest. Wilson appears to acquiesce in the opinion of Dr. Potter of Baltimore, that the only possible explanation is that the surplus eggs are removed by the foster-parents themselves.

WHAT IS A 'FEROX'?

XV.

WHAT IS A 'FEROX'?

In the reports from our angling centres which appear every season in the columns of the Press, we are constantly meeting with an old familiar friend, the ferox, or the salmo ferox —on one occasion even the silver ferox; and should the question arise, let us say in the smoking-room of some Highland hotel, as to what a Ferox is, the reply will usually be something to the effect that it is a peculiar species of trout found only in certain large and deep lochs, growing to a great size, and of such innate ferocity as to deserve the specific title that has been affixed to it. Are there any grounds for this wide-spread belief in the existence of a distinct species—the so-called *Ferox*?

The extremely plastic nature of the whole family of Salmonidae is well known to all anglers and naturalists who have made any study of the question. It is doubtful whether any other family of vertebrates is so easily

influenced and altered in outward appearance by the varying conditions of its surroundings. Hence, there have always existed the most divergent views as to the question of the number of species in this family. Thus, in 1836, Yarrell enumerates six separate species of British Salmonidae, including not only the Great Lake Trout or *ferox*, but also the par, not at that date recognised as being merely the early stage of the Salmon. So also Jardine in 1839; while Agassiz[1] already in 1834 admitted only three species, the salmon, the sea trout, and the common or brown trout. But the passion for the sub-division of species seems to have an extraordinary attraction for some minds. In the British Museum Catalogue of Fishes, 1886, Dr. Günther divided the genus *Salmo* into no fewer than six migratory or anadromous, and six non-migratory or freshwater species, among which latter, of course, the *ferox* figures. On the other hand, Dr. Francis Day in *British and Irish Fishes*, 1880-4,—a work which to this day holds its position as the standard authority—reduced the number to three: the salmon; the sea trout, with its varieties, as the brown trout, Loch Leven trout, etc.; and the char; thus showing

[1] *Reports: British Association.*

close agreement with the views of Agassiz, published half-a-century earlier.

Now in order to determine the question as to whether a certain form is entitled to specific, or merely to varietal rank, it is first necessary to define with exactitude what it is that constitutes a species; and it is very doubtful whether a better or more authoritative definition can be found than that adopted by Dr. Day.[1]

'I shall consider species among the true Salmons to be an assemblage of individuals which agree together in their structure, and in the development of the sexes, but differ in some structural character from all other fishes.'

Taking, then, this definition with its weighty authority as our test, let us proceed to enquire in how far the so-called separate species *Salmo ferox* fulfils its requirements.

The structural characters which have been chiefly relied on as indicating specific differences in the varying forms of our Salmonidae are chiefly as follows. The number of vertebrae; —now of these, according to Dr. Günther, the number in the common or brook trout ranges from 57 to 60, and in *Salmo ferox* from 56 to 57; but Day records instances in undoubted

[1] *British and Irish Fishes*, Vol. II. p. 55.

brown trout where they ran from 56 to 60. So, too, with the number of caecal appendages, of which Günther assigned 43 to 49 to *ferox*, and from 33 to 47 to *fario*; but Day found instances of from 33 to 61 caeca in the common trout; so that the inconstancy of these tests is at once apparent. The same result is also arrived at in the next proposed test, viz. the number of rays in tail and fins; as well as in another relating to the arrangement of the vomerine teeth. In both these latter cases, the results are again so varied and inconstant as to make it evidently impossible to base any safe conclusions thereon as to specific differences. Colour will be at once admitted by all to be a hopeless test; all know the infinite variety of coloration and marking in trout from the same lake, or even from the same pool of a river. We come, then, to this, that after the most painstaking researches by many eminent naturalists, no one constant and certain difference of structural character has been discovered as between the brown trout and the so-called ferox.

If one listens to gillies and boatmen no doubt one will be told of various infallible methods of distinguishing the 'ferok' from the 'trout,' but the curious point is that no two of them will be

found to agree upon the matter. I remember well my own first experience with such a fish, many years ago upon Loch Awe. Rowing down to the 'Crow Island' a short thick handsome trout of some 5 or 6 lbs. weight was caught, and at lunch time on the Island it became the subject of animated debate among the boatmen there assembled; but the question was set at rest—at least to their satisfaction—by the dictum of the oldest, who pronounced it to be most certainly a 'ferok,' 'because it had five large black spots on the gill-covers.' It seems to have come to this on some Highland lochs, that any trout above a certain weight caught by trolling must be a ferox; if caught on a fly it is a 'trout.' But apparently the necessity of some considerable weight is now abandoned; for a ferox of 1½ lbs. has before now been recorded, and in a recent report from Lairg six ferox weighing together 15½ lbs. are mentioned.

The most convincing proof to me, however, is that it has been my experience to see the great so-called ferox developed in a few years from the insignificant fingerling-trout of a Highland hill burn. Just thirty years ago a party of anglers found themselves, as was their wont, on a summer holiday in Sutherland; and the weather being too fine for fishing, it was resolved

to carry out a long-deferred intention of 'stocking' with trout a chain of three small lochs lying high up on the hills, and till then absolutely devoid of fish-life. Some 150 little brown trout were caught high up in a precipitous mountain burn where no spawning trout from the large loch below could possibly ascend, and were duly liberated in these little lochs, the average weight of the little trout being some 7 or 8 to the lb. Twelve months later one of these trout was caught—a bar of burnished silver, and weighing just 1 lb. Another year passed, and again the 'wee lochies' were visited, and again from the very same projecting rock and by the same hand (now alas! long still), a trout was hooked and safely landed, of which the counterfeit-presentment lies before me. Just 19½ inches long, perfect in shape and colour, it weighed 4¼ lbs. But mark the sequel, which may best be told in the words of a letter from Mr. J. A. Harvie-Brown, read at a meeting of the 'Scottish Fisheries Improvement Association' in 1884—he having been, with me, a member of the party who originally stocked the lochs:

'They developed huge fins and square or rounded tails, lost all spots, took on a coat of dark slime, grew huge teeth, and became "feroces" in that short time. The common

burn trout, taken from a very high rocky burn up in the hills, in two years became indistinguishable from *Salmo ferox*. The first year they grew to about 1 lb. or 1¼ lb., took on a bright silvery sheen of scales, were deep and high-shouldered, lusty and powerful, more resembling Loch Leven trout than any others. This was when their feeding and condition were at their best; but as food decreased and they rapidly increased in number, spawning in immense quantities, and with no enemies, the larger fish began to prey upon the smaller, grew big teeth, swam deep and lost colour, grew large fins and a big head, and became *Salmo ferox* so-called. In two years more the food supply became exhausted, and now (1884) the chain of lochs holds nothing but huge lanky kelty-looking fish and swarms of diminutive "black-nebs," neither of the sorts deserving of the Anglers' notice.'

In the large lakes of the Continent a trout is found growing to a great size sometimes termed *Salmo lacustris*; and Berkenhout (1795) supposes, probably with truth, that our 'Great lake Trout' is identical with it. Jardine and Selby, with the tendency to subdivision of species so prevalent in their day, gave to it the specific name of *S. ferox*; but Moreau observes that

'la truite feroce, *Trutta ferox*, est une simple variété de la Truite vulgaire et nullement une espèce particulière.' Dr. Day, after all, our best authority to this day, comes to this very distinct conclusion:

'In fact the Great Lake Trout of Geneva is the Salmo ferox of lakes in Wales, the North of England, Scotland and Ireland, and merely a form of our fresh-water trout.'

It has been sufficiently shown, I would think, that the so-called Salmo ferox agrees in structure and in the development of the sexes with the ordinary brown trout, and differs from it in none of these points, the test with which we set out at the beginning of this inquiry; but once an error has taken root it is proverbially difficult to eradicate it. And so long as it is a matter of self-interest to hotel-keepers, boatmen, and others to proclaim that their waters hold a rare fish of great size and ferocity, just so long may one expect to meet with our old friend the ferox.

Meantime it may be asserted, without fear of contradiction, that the unanimous opinion of modern scientific authorities is that in Great Britain and Ireland we have, in all its varied forms, but one species of fresh-water trout, *Salmo fario*.

THE COLOUR-SENSE IN FISHES.

XVI.

THE COLOUR-SENSE IN FISHES.

THE question of the powers and limitations of the organs of sight in fish, and the extent to which they enable them to discriminate between colours, is an interesting and difficult problem, appealing strongly to the fisherman as well as to the naturalist.

As in all questions connected with the investigation of the life-history of fish, the matter is rendered all the more difficult by the fact of their inhabiting a different medium from ourselves. Nevertheless the experienced angler who is also an observant man,—and the two are not necessarily always synonymous,—must have often had opportunity of noting facts throwing light on some aspects of the question.

From the point of view of the fisherman the sense of sight of fishes, and particularly of the Salmonidae, is doubtless of much importance. That their eyesight is acute, to an extent that is proverbial, needs no demonstration. The

veriest tyro, as he passes along the banks of a clear trout-stream, will soon learn this elementary fact for himself. As his education proceeds, he will also speedily note that the trout's range of vision is chiefly forward and upward; and lying, as they necessarily do when at rest, with their heads up-stream, he finds that to approach within reasonable distance unseen he must keep down-stream from them and as low as possible. This is the foundation of the first principle of clear-water stream fishing, wading up-stream.

A much more intricate and difficult question is that as to the power of discrimination of colour by fish. Do they perceive the differences of colour; if so in what degree; and do these colours produce the same effect on the fish's as upon the human eye? It is permissible to assume that as fishes see, partly, at least, through a different medium, the resultant impressions received by them will vary from that in our own experience. In the case of the angler's fly, it will be generally seen by the fish against the sky, that is, against the source of light; and if we hold a salmon-fly, however gaudy and brilliant, between our own eyes and the sky, we find but a dark silhouette appearing, with possibly reflected rays of coloured light from hackle-fibre

or tinsel; but all the meticulous minutiae of the fly-dresser have disappeared.

Half a century ago the salmon flies of the Tweed, and generally throughout Scotland, were sombre affairs, as is seen by the patterns of Stoddart and others; black, red or claret mohair or pigswool, a hackle dyed or plain, a turkey, mallard or teal wing, with perhaps a little tinsel. But Stoddart thought it wiser that the tinsel, if used, should be tarnished. When later the fashion of using the bright, so-called Irish, flies came in, the solemn warning was given that the fish were being frightened back into the sea.

To-day the gaudy fly reigns almost indisputed. Yet there are many anglers, and these not the least experienced, who hold that if the old quiet patterns were once more fished as assiduously as the new the results would be much or quite the same; that the 'best fly,' in fact, is still that which is oftenest and longest in the water.

Formerly there were few professional tackle-makers. Flies were dressed by the angler himself or obtained from the local semi-professional who, in the days of unprotected waters, was everywhere to be found. These naturally used the materials readiest to hand, and the

results being satisfactory, they were content. The increase in the ranks of fishermen, consequent on increased travelling facilities, changed all that, and much else. New men brought new ideas, new materials, new experiments.

A fisherman, however, is not necessarily a logician. He fishes, we will say, with a certain fly without success; changes it for something different in colour, and lo! fish after fish succumbs to its attractions. What more can he wish? Of course the fly has done it. It does not seem to occur to him that had he continued to fish with No. 1 the result might, very possibly at least, have been the same. In fact we have here simply the old problem of *post hoc* or *propter hoc*.

As a rule gillies and boatmen are very opinionative as to the patterns that alone, according to them, are of any use in their particular waters, and for the sake of peace it is as well, perhaps, to give in to their prejudices. Should the angler, however, persist in the use of some unorthodox lure and achieve success, he must by no means assume that he has thereby converted his attendant, who will believe, and probably assert, that had his advice been followed the bag would doubtless have been doubled.

It is not always so, however; there are some

in the ranks, more especially among the younger and better educated, who have profited by experience and observation, as in the following instance, which took place some years ago on a well-known stretch of the Aberdeenshire Dee. Pool after pool had been fished in vain, and a new cast having been reached the old vexed question was discussed with the gillie, who on that famed water had assisted at the death of hundreds of salmon.

'Shall we try Jock Scott?'

'Well it might do very well.'

'Or this Gordon?'

'It's a capital fly the Gordon.'

'Or a Thunder and Lightning?'

'Couldn't do better!'

'In fact, then, it doesn't matter which?'

'No' a ——!'

One of the most successful salmon fishers of the last generation, as the result of the experience of a long life-time on Tay and Tummel, latterly confined himself strictly to a single pattern of salmon-fly, dressed by himself. It was a thin, light-blue floss-silk body ribbed with tinsel, and a light wing of mixed fibres.

When we come to consider trout and trout-flies, the question is in one way different; for whatever salmon-flies, so-called, may be

supposed to represent, they certainly bear no resemblance to flies; whereas trout-flies are presumed to be imitations of natural insects, at least in so far as river-fishing is concerned. One might therefore suppose that here, at least, the matter of colour must be all important, always assuming that trout have the power of colour discrimination; and in the view of the 'Dry-fly purist,' as he loves to be termed, it is taken for granted that it is so. One has only to study the very interesting text-books of Mr. Halford, for instance, to find that the most delicate shades of colour in silk, hackle or wing are strenuously insisted on.

Let us look, however, for a moment on the other side of the shield, and recall the most interesting and practical experiments of Sir Herbert Maxwell, well known as an angling expert, an observant naturalist, and one endowed to an unusual degree with the faculty of critical analysis and deduction. The results of his experiments are embodied in a report published in the *Field* of 19th June, 1897. As all readers may not have access to it, a short summary may be of interest. Sir Herbert had some May-flies dressed in the ordinary way, except that they were dyed of a brilliant scarlet or blue; and with these he proceeded to fish

during the May-fly season in a well known southern trout stream noted for its large and wary trout. Beginning with the usual more or less exact copy of the natural insect, with which he caught several trout, he then proceeded in bright sunshine to cast a scarlet fly over a rising fish; it was at once accepted, and a fine trout landed—all doubtless to the utter astonishment of the attendant keeper. The same fly was then presented to another trout, with the same immediate result. A brilliant blue May-fly was mounted and just as greedily taken by another victim; and so on throughout a most successful day, when some thirty trout, none under a pound in weight, were landed, of which nine weighing 13½ lbs. were kept. Of the thirty a few were caught on the usual imitation; the rest took the gaudy scarlets and blues, some of which eccentric-looking patterns are now before me. Sir Herbert then gives in detail a second and equally successful experiment in another river, where trout up to 2 or 3 lbs. in weight fell victims to the same unorthodox flies.[1]

Against this instance may be given an experience of the writer's, which seems to point

[1] The *Field* article is reproduced *in extenso* in his interesting book, *Salmon and Sea Trout*; Lawrence and Buller 1898.

in the opposite direction. Fishing a number of years ago on the River Deveron, a big rise of fly came on suddenly, and large trout were at at once rising in a 'boil' in all directions; but, as so often happens in such circumstances, they would not look at the artificial flies offered to them. After several changes, a cast of Yorkshire hackles was tried with gratifying success, and a nice basket of good average size was secured. But every one of these was taken on one particular fly, the so-called 'partridge and blue.' This fly, moreover, was not at the end of the cast of four flies—usually the most killing position—but higher up.

This was thought at the moment to be a great discovery, and many 'blue partridges' were sent for; but never again was it found to be of much, or any use. Now all the other flies on the cast were likewise Yorkshire hackles of exactly the same size and pattern, save only colour, and all were patterns of proved value as killers on Deveron; so wherefore the preference for that particular blue? To the writer the riddle remains unsolved.

On the point in question, Mr. J. A. Harvie-Brown says:[1] 'Trout show decided preferences for colours (at least educated trout).' That

[1] *The Wonderful Trout*, p. 41; David Douglas, 1898.

writer's opinion on any subject connected with Angling or Natural History must carry great weight, although in this instance running counter to the experience of Sir Herbert Maxwell, as given above.

To leave the Salmonidae for the moment, and to turn to the pike, it seems to have been long generally held that a 'bit of red' about the bait often proved enticing. We have all seen the tuft of red wool so frequently tied round the end triangle of a spoon. In corroboration of this theory a friend recently related the following instance to me. During a visit to Loch Awe, trout fishing being 'off,' it was resolved to make a raid in the loch upon the pike, of of which there are only too many for the well-being of the nobler species. Two rods were equipped, the one with an ordinary brown phantom, the other with a red one—at one time, if memory serves, esteemed to be 'good medicine' for salmon in Loch Tay.

The pike proved to be in taking humour, and the result was something like nine or ten of good average weight. But every one of these was caught on the scarlet bait; the other, with exactly the same chance, did not elicit so much as a casual 'offer.' It is, perhaps, worthy of notice that a pike following a spinning bait

will see it more or less on its own level and often against a background, say of weeds or shore; and this is also true to some extent in the case of the salmon, which frequently follows the fly a long way before making the final dash. Whereas, as a rule, the trout must see the fly against the sky and light, presenting therefore only a dark outline.

The same friend was good enough to call attention to a passage in Herbert Spencer's *Autobiography*, bearing on the subject under consideration:

'My constitutional tendency to call in question current opinions, was manifested when fishing, as on other occasions. While in Wales the year before, occupied in writing on Psychology and occasionally casting a fly over a stream or llyn, it occurred to me that, considering how low is the nervous organization of fishes, it is unlikely that they should be able to discriminate so nicely as the current ideas respecting artificial flies imply—unlikely, too, that they should have such erratic fancies as to be taken by combinations of differently coloured feathers, like no living creature ever seen.

'I acted upon my scepticism, and ignored the local traditions. Hearing me vent my heresies, the farmer, tenant of Beoch, challenged me to

a competition. It was scarcely a fair one, for my flies, made by myself without practice, were, of course, ill-made, and the bungling make of them introduced an irrelevant factor into the competition. Notwithstanding this, however, fishing from the same boat we came back ties; showing that the local flies had no advantage.

'I may add here that in subsequent years I systematically tested this current belief in local flies; and on various lochs and four different rivers found it baseless. This experience furnished me with a good illustration of the uncritical habits of thought characteristic, not of the common people only, but of those who have received University educations. For in every case I have found highly cultivated men —professors and others such—accepting without hesitation the dogmas of keepers and gillies concerning the flies of the river. Always their assigned reason is that these dogmas express the results of experience.

'But inquiry would show that those who utter them have never established them by comparisons of numerical results. They simply repeat, and act upon, what they have been told by their predecessors; never dreaming of methodically testing their predecessors' statements by trying, whether, all other things being

equal, other colours and mixtures of colours would not answer as well. The delusion results from pursuing what, in inductive logic, is called the method of agreement, and not checking its results by the method of difference.'

This passage emphasises admirably the vague attitude of thought of even educated men on such questions, and the fallacy of drawing general or universal conclusions from isolated and exceptional instances. If we are to arrive at a more exact apprehension of the powers and limits of the vision of fish, and of the impressions produced in them by colours, we must first have a series of long and carefully conducted experiments. The results, duly noted and tabulated, would form a ground-work for investigations that should lead to conclusions of greatest interest to anglers and naturalists.

SPECIES OR VARIETIES IN OUR SALMONIDAE.

XVII.

SPECIES OR VARIETIES IN OUR SALMONIDAE.

THERE is a well known and marked divergence of view as to whether the various forms of our Salmonidae are to be regarded as merely local races and varieties, or as entitled to specific rank. This difference of opinion appears to be attributable to two main causes. One of these is the extraordinary plasticity of the whole family, as exemplified so strikingly in our ordinary brown trout, which are found in every variety of colour and marking; dark trout and light trout; greenish trout and brown trout; some with large red spots and some with many small spots; others again with none, and so on through an infinite variety of form. The other main source of difference arises from the loose and inaccurate use of the term 'species.' These questions have been partially examined in my previous chapter on the so-called 'Ferox.' It is sufficient here to say that in the further consideration of the relationship and differentiation

of our various forms or races of the Salmonidae, it is proposed to accept Webster's definition of 'species' as 'an ideal group of individuals resembling each other in essential characteristics and capable of indefinitely continued fertile reproduction through the sexes.'

As examples of extreme divergence of opinion on this subject we may note that whereas Günther, 1866, gives no less than twelve separate species of the genus *Salmo*, Agassiz, 1834, already restricts the number to three; while Dr. Day, held by many to be still our best authority,[1] is content with only two, that is, if the chars are left out of consideration. It is proposed, for present purposes, to treat only of the more important of the British *salmones*, *i.e.* the salmon, sea trout and common or brook trout, omitting such as the grayling, char, vendace, and others of the family. Those admitted by Agassiz were *Salmo salar*, *S. trutta* and *S. fario*; by Day, the salmon and the sea trout, 'and its several varieties, as the brook trout, Loch Leven trout, etc.'

We have seen above that in the common or brook trout and loch trout we find an infinite variety of colour and marking. The same is found to be the case, if in lesser degree, in the

[1] *British and Irish Fishes*, 1880-84.

migratory forms usually included in the general term, sea trout. Some are thickly spotted, some with a few large spots, others with almost none. All, however, turn darker and more spotted with residence in fresh water, and assume various coloured markings at the time of reproduction. Experienced anglers will recall instances when they have found it difficult or impossible to decide with certainty to what category some particular capture should be assigned. We find that a sojourn in salt water has the effect of producing in the anadromous races a bright silvery sheen or hue which becomes quickly dulled and impaired on entering our rivers and lakes. On the other hand, the brown or brook trout, which frequent the lower or tidal reaches of rivers, gradually assume this silvery coat in greater or less degree according to the length of their stay and the brackishness of the water. In this state they are constantly caught by fishermen in salt water, sometimes at quite a considerable distance from the nearest fresh water.

Again it is to be remarked that some lochs, as for instance Loch Leven, Loch Craspuill, and others, produce trout of remarkable silvery appearance.

If coloration may thus be dismissed as value-

less in the differentiation of forms, the same is found to be the case in the examination of structural characteristics. A full statement of the results arrived at, after careful examination of all the varied points of difference that have been held to constitute valid evidence of specific distinction, will be found in Dr. Day's *British and Irish Salmonidae*, where it is shown conclusively that in each and every case such characteristics have been found to be inconstant when the examination extended over a sufficiently large number of examples. All these forms or races agree in 'essential characteristics.'

It has also been proved by careful and repeated experiment, notably by Sir James Maitland and Dr. Day at Howietoun, that the various forms, both anadromous and fresh water, are capable of breeding *inter se*, and that their progeny are fertile. It has further been established there that the descendants of an anadromous race, artificially reared and confined to fresh water, have themselves reproduced their kind. In November, 1885, Dr. Day exhibited at a meeting of the Linnean Society a par 5½ inches in length, one of a shoal hatched at Howietoun in March, 1885, from parents themselves reared from ova and milt taken by Sir James Maitland

from Teith salmon, which parents had, of course, never descended to the sea.

Apart from such experiments we have in the so-called land-locked salmon of Scandinavia and America races of fish, indistinguishable structurally from our British salmon, which spend their whole lives in fresh water. The term 'land-locked' is inaccurate; for there is nothing to prevent these fish from descending to the sea, although there are certain obstructions in the way of their return. They appear to find the vast areas of fresh water to which they have access sufficient for all their requirements.

An important point to be remembered in the consideration of the question of relationship is the fact that in the youthful 'par' stage of every race we find an almost absolute uniformity, so that it is with difficulty, if at all, that they can be separated with certainty. The cross bands or 'par-marks' are common to all, being lost in most cases on reaching maturity, although persisting throughout life in the case of the brook trout of some smaller streams; an instance, apparently, of arrested development through less favourable environment.

All the evidence, so far considered, points to the fact that the different races of our Salmonidae have certainly descended from one

common ancestor, a conclusion leading to the difficult and much disputed question whether this common progenitor was of marine or fresh water origin. On this point opinion has always varied. Dr. Day, while not committing himself to a decided pronouncement, appears to incline to the view of a marine ancestry, and such is also the opinion of that eminent authority, Mr. Calderwood. One hesitates to oppose views of such weight; yet we are met with the fact that all of our *salmones* are only capable of reproduction in fresh water. It is well established that even in slightly brackish water their ova lose vitality and perish at once.

In the case of our migratory birds we find the homing instinct urging them, as the season of reproduction approaches, to seek the furthest limits of their migration, ever pressing in face of all difficulties towards those northern regions that are held to have been the place of origin of their ancestors. It would seem, then, somewhat strange to find, in the case of the Salmonidae, this homing instinct not only lost but absolutely reversed. A point rather in favour of the other contention should, however, be mentioned. Certain small streams and chains of lochans in the north of Scotland were, a number of years ago, full of small trout in their

lower reaches only, below certain unsurmountable falls above which no trout was to be found until a number were carried up and placed above the obstructions. Since then they have multiplied exceedingly, and now afford excellent sport.

The life-history of that strange fish the eel, is in some ways exactly the opposite of that of the migratory Salmonidae. Modern research has proved that this fish, which passes its adult life in fresh water, returns once for all at the time of reproduction to great oceanic depths; the young eels ascending our rivers when they have assumed their final form, after passing through strange transitional changes in the sea.

One can hardly discuss this subject without adverting to the notable and interesting results of experiments in Australasia. There fish hatched from indubitable ova of English brown trout have, within the life-time of men yet middle-aged, developed to the size of 30 lbs. and upwards, have lost their red spots, assumed the silvery livery with black cross spots, and acquired the anadromous habit, descending to the sea and re-ascending to fresh water for purposes of reproduction;—changes of life and form, in a brief season, analogous to those

accomplished in our hemisphere as the result of untold centuries.

We find, then, that all of these races satisfy entirely the requirements of the definition with which we started, and that they constitute a complete unbroken chain; no man can say where one form ends and another begins. All merge imperceptibly into each other. In some, no doubt, we find the varying characteristics more fixed than in others; a burn trout is at once distinguishable, when in his native stream, from a sea trout. But the connecting links, as we have seen, are always to be found.

It may be asked what practical value there may be in such an enquiry and its conclusions. Apart from the reply that exact and definite knowledge is the very essence of true science, it must also be remembered that our laws have taken these fish under their special protection. Mr. Charles Stewart, in his *Law of Scotland relating to Rights of Fishing*,—a work of standard authority,—states: 'A right of salmon fishing is a separate heritable estate, and being so, it is like all the lands and real rights in Scotland, vested in the Crown according to the feudal principle'... 'the right of trout fishing is not a separate feudal estate, like salmon fishing.' And let it be remembered that the

word 'salmon' is held in law to include all varieties of migratory trout.

It will be seen that here we have material to raise many a knotty question, as, indeed, has already frequently occurred. Prosecutions for the taking of immature Salmonidae will be in the memory of many; and certain learned judges must at times have been astonished and perplexed by the conflicting nature of the evidence tendered by either side on the question of distinctive marks of specific differentiation. Well might the evidence be conflicting and perplexing if there be, in fact, no truly specific difference at all! Such matters must be left to the lawyers; but looking to the importance of the subject and to the march of exact science, nowhere more marked than in our increasing knowledge of the life-history of the Salmonidae, the view may be permitted that, sooner or later, a comprehensive revision of these laws must be undertaken.

MEMORIES OF A RIVER.

THE DEVERON.

XVIII.

MEMORIES OF A RIVER.

THE DEVERON.

THIS river flows in a northerly direction, winding from its source in a bleak and high-lying region of the north through a pastoral country, becoming more highly cultivated and populous as it approaches the sea. As I recall it, about the middle of its course, it is already of some magnitude—such a river as the salmon-fisher may usually cover without wading, but by no means to be forded, even at summer level, save at infrequent places. To the eye of the fisherman it is a perfect stream; deep pools break into foaming rapids which again flow on in glassy 'glides,' or widen out into broad gravelly shallows—throughout diversified by boulders and stones, great and small.

The little inn that is our resting-place stands on its bank at the end of the village street where the bridge carries the main road across. Here, under its high arches, the water ouzel, year after year, brings out its brood in perfect

safety from the most enterprising urchin. This cheery little bird is our constant and welcome companion, bowing and curtseying on some mid-stream stone. Should we be able to watch him from a higher level, as he dips below the surface, we shall see him, as it were, flying through the water, stemming the strong current with his powerful little wings. Anon rising in a calmer corner, he floats high and buoyant on the water like a tiny duck, then diving again, continues his pursuit of the aquatic insects that form his food. It is pleasant to think that few are now so ignorant as to persecute this harmless little creature.

This river is noted as being one of the most prolific of trout-streams, excelling not only in the number but also in the size and beauty of its trout. It is a sight to be remembered when on some fine day in spring one happens to be witness of a great rise of March-browns, Blue duns or little Iron-blues. The surface of the water is broken by a constant succession of rings as the big and hungry trout suck down the delicate morsels as they emerge for a brief moment on the surface; for many of them their life-span may well, indeed, be termed ephemeral. The inexperienced youth who thinks that now at last he has lit upon that day of days of which

he has so often dreamed is apt to be somewhat disappointed. Casting rapidly to right and left into the middle of the 'boil' he finds too often that his best imitation is left severely alone; the genuine article is in too great abundance, and eventually he learns that it is before and after the exuberance of the rise that he will have his chief success, and that when the natural insect is thickest on the water, some fly quite unlike it is most likely to prove acceptable; just as with ourselves, 'toujours perdrix' will sometimes pall.

Looking upwards from the bridge we see a stretch a quarter mile in length of water perfect to the fisherman's eye; pools large and small diversified by streams broken and vexed by stones and boulders. We recall whole days spent on this one portion, with the result that the pressure of the basket strap on shoulder hinted that enough had been done for sport and pleasure; for, be it noted, for the full enjoyment of one's river one must be alone.

A little way above the bridge a huge boulder stands half in the water which surges round and under its base. Standing just above it one day, a long cast towards the opposite side happened to hook an inconsiderable troutlet which was quickly drawn, glancing and splashing, across

the stream to be released. As it passed the boulder a dim grey shadow shot from the black cavern beneath, and missed the wriggling prize. Here, then, was an opportunity, and a plan quickly formed. From the shallows further down a four-inch baby trout was soon procured, sliced through in proper slant, trimmed *secundum artem* and mounted on a big hook. A minute later this, too, came skipping and jerking past the boulder, and then the reel sang pleasantly as some twenty yards of line ran swiftly off; a beautiful trout, that presently pulled down the scale at about two pounds.

A little further up, a heavy plank reaching from shore to a big flat stone to command a certain salmon-lie, recalls an awkward predicament. This river holds salmon as well as trout, and one day in late summer a goodly fish was hooked in a pool some hundred yards above. In this pool, however, he refused to stay, the river was high and, in spite of all persuasion, down-stream he needs must go. And as the plank came ever nearer it was speedily seen that the river was almost lapping it and, should the fish pass beneath, the unpleasant choice would be presented either to 'break' or to dive overhead in four feet of water and follow his example. Fortunately, at this moment two

ladies came along the river side, the fish was hauled by main force into a small deep eddy under the steep bank, the rod entrusted to one of the ladies to hold like grim death while the fisher slipped down with the gaff; and so all ended well.

Above this charming stretch, with its sound of many waters, the scene changes. An ancient and massive dam stretches across the river to impound the water for the needs of the quaint old mill below. Here, then, we find a long and placid pool, fringed on one side with noble trees that dip their lower branches to meet their own pictured shadows in the depths below.

That corner, where the mass of yellow marsh-marigolds shines golden, reminds us of the reed bunting, with his black velvet cap and white cravat, whose nest cost so much time and pains to find. In the adjoining field a redshank one year nested. As we pass along the water side a moor-hen scuttles off the nest, splashing along in a way not conducive to our sport if on fishing intent; or, later on, with its quaint upturned tail, leads its family of fuzzy little balls of down and teaches them to pick the insects from the stems of the water-grasses. A 'plop' at the edge of the pool and a widening circle on the surface attracts attention, and is found to have

been caused by a water vole, whose black coat, as he swims deep in the clear water, is spangled with glistening air-bubbles; a black coat in this instance and not brown; for the black race or variety is here often to be seen.

So we wend our way upwards, past a famous pool where a considerable tributary joins our stream; then, leaving behind us a hospitable mansion with many happy memories, we pass by stream and linn, each with its story of varying fortunes, under the long hanging wood carpeted with myriads of wild hyacinths, like a sheet of azure, until the upper march is reached. Here often has our gaze been cast enviously upward at that forbidden stretch that seemed so tempting; not that it was one whit better than our own!

Another day, perhaps, we wander downward from the bridge, passing the great pool whose head it spans; a place where the modern dry-fly expert would doubtless find congenial conditions for his special craft. Here one side of the river is overshadowed by old trees that in ancient days no doubt formed an avenue for the stately old Scottish mansion that shows through their branching foliage, an idea strengthened when we find a tiny stream that here enters the river spanned by a little stone bridge of single arch

and pillared balustrade, whose apparent age lends credence to the legend that a Queen of Scots had crossed it one day on her journeying.

These trees recall that here one year, late in the month of May, a flight of at least a hundred fieldfares still lingered. How comes it that these beautiful thrushes ever refuse to remain to nest in this country, while in Germany they have for long been known to breed and are, indeed, steadily reaching southwards? But so it is, that the supposititious cases, now and then reported, are always found on investigation to be nests of missel-thrushes. This stream which we are now passing reminds us that here, one cold spring day, when trout were 'dour' and nothing doing, the fisherman was startled by a sudden thunder-peal right overhead, followed by a heavy hailstorm; when all at once the water was alive with rising fish attracted by the sudden appearance of swarms of the little 'iron blue,' which tiny insect seems to revel in cold and wet.

A gaunt old ash-tree gives its name to the next big pool where a wide stretch of gravel extends in ordinary states of the river from the water to the bank. Here once a lesson was learned of a danger to be guarded against when fishing these northern rivers. While wading in

the shallow margin of the pool the water was seen to be becoming quickly muddy, although but a few showers had fallen there that day. The bank was barely reached when with, a rushing roar, a great wave of clay-coloured water swept down the stream and in a moment the gravel-bed was covered by a relentless flood against which no man could have stood; there had, no doubt, been a 'cloud-burst' further up.

Round the next bend we see a copse-crowned bank, every bush of which is covered with white blossom, as if by a sudden snow-fall. This beautiful effect is puzzling, until, coming nearer, the bushes are found to be the hack-berry or hag-berry, better known in the south, perhaps, as the bird-cherry. Here is another famous stream and pool where once a big and greedy trout came nigh to its undoing. A nice half-pounder had taken the fly and was making a brave little fight in the deeper water, when suddenly the resistance became quadrupled, the little rod bending to its utmost. Some sullen play ensued, and then, as the shortening line brought the quarry into view, it was seen that a monster trout had gripped the first fish cross-wise in his cruel jaws and was allowing himself to be brought shoreward. With all possible care and caution the net was placed in readiness,

but just as it was being raised the jaws were opened and the prey released; its sides were scored by the great teeth as if 'crimped,' as was once the custom on Tweedside with salmon.

A well-known cry overhead calls attention to a pair of oyster catchers flying down-stream to a neighbouring ploughed field where subsequently their nest was found—a foolishly named bird; our Scottish designation of sea pyet is surely more appropriate. In Gaelic it is named 'Brideun' or 'Gille-Bride'—St. Bride's bird or servant. Wherefore it is so called is obscure, but it is a quaint and noticeable bird which, for some reason known perhaps to itself, makes its way each spring from the seashore far up our rivers to its breeding place.

Another story is called to mind a little further down, where the violent tactics of a trout caused visions of something of really extraordinary dimensions to arise; but when brought to net after a prolonged conflict it was somewhat disappointing to find it was only a respectable 'pounder.' Hooked fairly in the mouth, the casting-line had formed a running noose with one of the droppers just above the tail, and so lassoed, with all pressure on the mouth removed, the trout had been able to fight in the strong

stream after the manner of a fish of five times its weight.

So downward we wander by the river until we reach a big pool of good repute among salmon fishers, where, years ago, an acquaintance of mine had an interesting experience. Fishing one day with a friend, they agreed to meet at this pool at lunch time. The day had been unproductive, and one of them had been trying a minnow as a last resort. While lunching on the bank the line and minnow were carelessly thrown into the pool. Some time elapsed, and the post-prandial pipe lit, when the tip of the rod was seen to twitch, the line running freely from the reel. When the rod was raised something strong and heavy was found attached, was duly played and landed; it was a handsome fresh-run grilse. It is surely a most uncommon occurrence for a grilse to take a dead bait lying on the bottom and to swallow it. A year later, almost to a day, the same two friends were once more lunching at the same spot, and, half in jest, the line was again baited with a minnow and thrown in. After an interval, just as before, the line ran out. The fishermen were almost uneasy at the uncanny coincidence; the fish was played and landed. But this time it was a large and slimy eel.

THE BALANCE OF NATURE.

XIX.

THE BALANCE OF NATURE.

It may be assumed to be a generally accepted proposition that every creature has its own appointed use and purpose, and has its place in the whole scheme of creation; yet it is also true that we constantly hear animals,—beasts or birds,—spoken of as belonging to one or other category of the noxious or innocuous. We have indeed a somewhat unpleasant word to designate the former, a word that has travelled far from its original meaning; we call them 'vermin.' When, however, we give the matter closer consideration, it will be found by no means an easy task to draw hard and fast lines separating, as it were, the sheep from the goats. We find it to be a matter of proportion, circumstances, and surroundings, just as 'dirt' was properly described as matter in the wrong place.

In India, in districts where game is still plentiful, the tiger is looked upon by the native cultivator as a benefactor who keeps down the

wild animals that devastate his fields; but when game is scarce or non-existent, and the tiger preys systematically on his cattle, he is addressed with opprobrious epithets, and the assistance of the Sahibs is invoked for his destruction. Here in our own country we have got into a way of loosely classing certain beasts and birds as 'vermin,' to be destroyed in every way possible without further trial, and of this habit it may be of interest to consider a few examples.

To take first our own larger carnivora, the fox, the badger, and the otter, there is undoubtedly something to be said on both sides of the question. It must be admitted at once that in the sheep-farming Highlands of to-day the fox is a nuisance, and cannot be tolerated, but in the Lowlands the case is different. Leaving aside entirely the question of fox-hunting as a sport, the balance of evidence on the whole seems in favour of the fox. His chief food is usually the rabbit, and surely there are more than enough of these for him and for us; but he is also fond of much smaller game, such as field mice and voles, for which he hunts assiduously, as well as of beetles and other of the larger insects; on the whole, the verdict of an intelligent agricultural jury will be 'not guilty.'

To turn to another of our larger carnivora,

the badger, this is a long-suffering animal which, on account of ignorant prejudice, has been so persecuted that it is now rare in Scotland, although comparatively plentiful in some districts of England, where its harmlessness is probably better understood. An omnivorous feeder, living on roots, vegetables, fruits, beetles and insects, reptiles and mice, with a special love for honey and wasp-grubs, he is decidedly useful on the whole; his fondness for an occasional change in the way of a nest of young rabbits being about the sole charge that can fairly be brought against him.

The case of the otter, the next of our larger animals, is not quite so plain. Where fish are plentiful his diet consists almost entirely of them, and at times he destroys more than he consumes. In his favour it is to be recorded that eels are a special favourite with him, and there is certainly no worse enemy than the eel to salmon and trout in their early stages. When fish are scarce, the otter contents himself with frogs, young rabbits, indeed with anything he can come by. There is on the whole, therefore, not very much to be said in his favour; but his mode of life and nocturnal habits enable him to take pretty good care of himself; indeed the otter is more plentiful than many people imagine,

and there is not much fear of his extermination for a long time to come.

It must be conceded that it is difficult to make much of a case in favour of the wild cat on the score of usefulness, under present-day conditions; their numbers, however, are now so few that they can do little damage in the wild and remote localities where they still exist. A few mountain hares or grouse are surely not too high a price to pay for the continued existence of such a magnificent type as a member of our Scottish fauna.

Much the same is the argument in favour of a lenient judgment of that beautiful and graceful animal, the marten, which one fears is still nearer to the vanishing point. Like the wild cat, and unlike the otter, they are easily trapped, and the only hope for them is that some of our larger proprietors may extend protection to them in time.

For the polecat, one fears that it is already too late to put in any plea; but if, as seems probable, our tame ferret is a domesticated race of the polecat, it is likely to be with us in this form for many a day.

In the case of the stoat there is much more and stronger evidence for the defendant. It cannot for a moment be denied that it is a some-

what dangerous neighbour for game of all kinds, yet it must be kept in mind that the stoat is a determined foe of the rat, as well as of the lesser rodents generally, and the rat is perhaps the worst enemy of all, both to the game preserver and to the farmer. The growing plague of rats is becoming a very serious, and even threatening evil, and it may be fairly urged that the stoat in moderate numbers is, on the balance of evidence, entitled to a verdict of 'not proven,' at least.

For the little weasel the case is stronger still; the farmer has no better friend, and those who remember the plague of voles which not so long ago caused much damage over large areas of Scotland, will surely agree that here we have a distinctly useful member of the community. It may be noted in passing that few seem to know that in the far north the weasel, like the stoat, becomes white in winter, and is the *M. nivalis* of Linnaeus. This has also been known to occur in Switzerland, although not in Great Britain. The so-called 'blood-sucking' propensities of this family are now admitted to be altogether imaginary.

So much has been recently written concerning the squirrel and its malpractices that it is unnecessary to say more than that it has been

abundantly proved to be most destructive in young plantations, and must be kept rigorously down. Sad, too, to say the squirrel seems of late to be developing a vitiated taste for the eggs and young of small birds, of which I have had specific proof. Mention has already been made of rats and voles, but a plea must be recorded for the water vole, usually and wrongly called the water rat. This pretty little creature, more of a beaver in miniature than a rat, is a vegetarian and must be classed as innocuous, excepting in the rare cases where his tunnelling may endanger the embankments of streams or reservoirs, or where in severe winters he causes damage to the osier-beds by barking their shoots.

Turning now to our British birds, we find a long list against whom sentence of death, even to extermination, has been ruthlessly decreed. That grand bird the erne, or sea eagle, is already gone as a breeding species; his congener, the golden eagle, survives in some numbers owing to the protection accorded to him in some of the larger properties in the north, and such is also the case with the peregrine falcon. It is sad that one cannot say the same for the osprey. One after another of its former stations have been cruelly robbed and harried, so that

it is to-day doubtful whether the osprey may still be retained in our list of British breeding species. The kite, too, with the exception of a very few in Wales, watched and guarded day and night, is gone, and so also are practically the harriers.

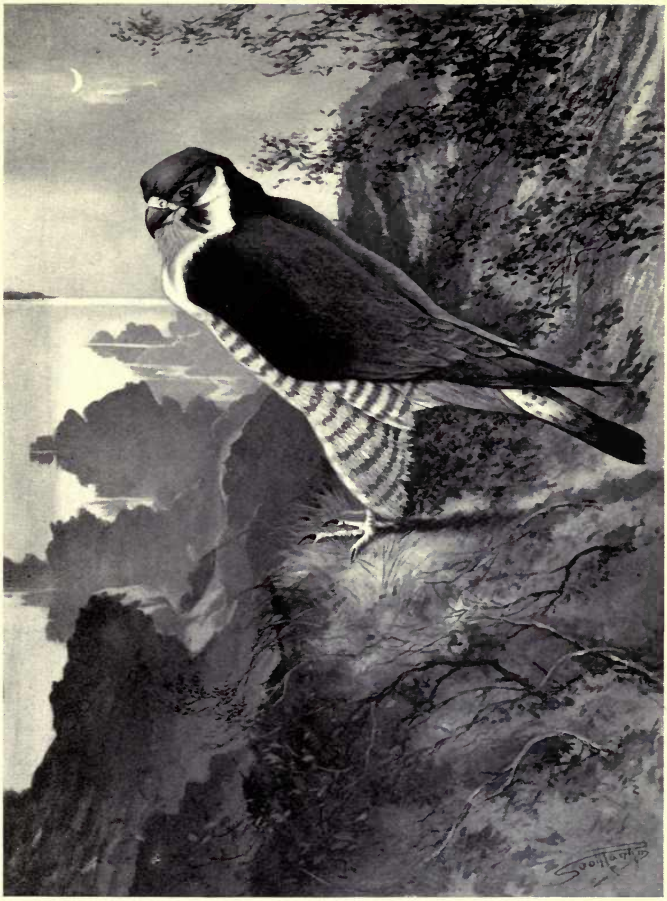
Of those of our birds of prey still remaining to us, the common buzzard is certainly deserving of protection. Feeding chiefly on moles, mice, voles, the smaller reptiles and insects, the good service it renders may well be placed against a very exceptional delinquency in the shape of a young rabbit or hare. In quite as great a measure is this the case with the kestrel, whose graceful hovering flight as it pursues its constant hunt for mice and voles forms so interesting a note in our country landscape, yet to how many of our keepers are these useful birds merely 'hawks,' and therefore to be slain at sight?

One would think that it would hardly be necessary to put in a word of defence for our owls, yet how often do these, too, hang in the keeper's museum in pitiful if mute protest against ignorance and incompetence? For the raven one would merely say that it were a pity that so grand a bird should be exterminated, but the hooded or carrion crow is a nuisance,

with difficulty to be kept within bounds, coming as they do in flocks on migration from the north; and the jackdaw of late years appears to increase so rapidly that there, too, a stringent check seems called for.

Two others of the *Corvidae*, the magpie and the jay, are each so beautiful an addition to our woodlands that, in moderation, they surely repay the little they cost. The rook question is a much larger one. In some quarters their increase seems to have passed all bounds of moderation. They have also developed new and unpleasant habits and appetites, hunting and destroying nests and eggs like their near relatives, the crows. On the other hand, their good deeds must not be forgotten, and the conclusion seems to be that the true balance in numbers must be sought for. The sparrow pest is another subject of much interest to agricultural and gardening readers; if the game-keepers would spare a few of the sparrow-hawks, and such lovely summer visitors as that fine little falcon the hobby, it would help; but as things are at present, the only remedy seems to lie in the way of co-operation and destruction.

Much more might be written on the balance of nature and man's constant interference, but the above may, perhaps, serve to cause some



Peregrine Falcon

who have the power of life and death over these creatures to pause and weigh the evidence more carefully before irrevocable sentence is pronounced. It is pleasant to know that there is already a marked improvement in this direction among the more intelligent keepers. Within a few miles of where these lines are written, the peregrine, the buzzard, the raven and the badger all breed yearly, and one can but hope that, before long, such will be the rule and not the exception.

APPENDIX.

THE ELEPHANT AT HOME.

THE ELEPHANT AT HOME.

It has fallen to my lot to have lived in daily proximity to the mightiest of our terrestrial mammals; to have seen from my verandah the great, grey, massive creatures marching solemnly and silently across the hillside within a rifle-shot of one's armchair. This was in Ceylon, before the era of the Suez Canal; when there was yet no harbour at Colombo, and ships lay at anchor far out in the roadstead; when railways were there still unheard of, and coffee-planting was at its zenith.

The Indian elephant is inferior in size to the African species, and is also structurally different in various points. The Ceylon race, again, differs from its Indian neighbours in that the great majority are tuskless, being for the most part provided with a pair of short 'tushes' only, which project but a few inches from the jaw. Ceylon elephants probably average, when full-grown, about eight feet in height at

the shoulder; but many exceed nine feet. Although they are always measured at the shoulder, the back is somewhat arched and gives a considerably higher measurement than the shoulder. A curious fact that has been frequently substantiated is that twice the circumference of the fore-foot will be found to give practically the exact height of the shoulder.

The elephant is gregarious, and generally lives in small bands or 'herds.' Twenty or thirty years earlier than the time referred to, before they had been so much persecuted, these herds were often very large; but at the time I was in Ceylon six or eight was a common number to find together, although on one occasion a herd was seen that must have been somewhere between thirty and forty in number.

These animals are distributed all over the Island and not, as often supposed, in the flat and hot 'Low Country' only. They were found throughout the mountainous Central Province to a height of 7000 feet or more. In spite of their great size, weight and apparent clumsiness, no hill-side is too steep, no pass too rocky or difficult for them. The 'elephant paths,' trodden by the feet of countless generations, are to be found traversing in every

direction those mountain ridges and summits: to-day, no doubt, much of the jungle or dense forest which used to clothe the mountains to the very top must have been cleared by the axes of the planters. These paths are to be found ascending rocky gorges, or threading steep and narrow passes which, in their ruggedness, one could scarcely credit as being passable by such unwieldy creatures. The peculiar structure of their hind legs, with their knees instead of hocks, must be of great assistance to them.

In old days the natives were accustomed, in default of fire-arms, to kill them in a cruel, if effective manner. In a defile, where the elephant must of necessity place his foot on a certain spot, a barbed iron spike was placed point uppermost, the lower end fixed firmly in a concealed log. His foot transfixed with this horrid implement, the poor beast was helpless and a ready prey to the spears of the hunters.

One day, on taking shelter from a shower, in a cave on a newly-cleared hill-face, I found lying on a rock shelf an old and much rusted iron weapon, which is now lying before me. It is eighteen inches in length, forged from a square bar of half-inch iron; at one end is a barbed blade about four inches in length, the rank barbs projecting some one and a half inches;

the other end is beaten out into a diamond-shaped point without barbs. This, we were told, was one of these very weapons; and certainly it seems to have been exactly adapted for such a purpose. Beside it lay an ancient leaf-shaped spear-blade ten inches in length and three inches in width. The tang was broken off, and the ferrule that had once encircled the shaft was lying beside it. The shaft itself had doubtless long since decayed.

Although so clumsy in appearance the elephant is surprisingly swift and active. Even on level and open ground an enraged elephant will soon overhaul the quickest runner in a straight-run course; in jungle, or the giant grass that clothes much of the open country, a man has no chance, unless he can evade his pursuer by quick dodging round tree or rock or some such cover. Even in densest jungle the noiselessness is extraordinary with which at times they will disappear from sight and hearing. When, on the other hand, a herd is suddenly alarmed and dashes off in panic, the crash of smashing trees and branches together with their loud reverberating roaring is awe-inspiring.

The eyesight of the elephant is rather defective, as might be surmised from the small and sunken eye; but the senses both of hearing

and of smell are extremely acute. When approached in cover and still unconscious of man's presence, their proximity is often betrayed by dull rumbling noises or perhaps by the rustling of branches as they are gathered by the trunk. Or attention may first be attracted by the flapping of the great ears as they fan themselves. Placid and sleepy as they may seem in such a case, a furious and charging elephant is the very incarnation of savage rage. The trunk and tail erect, the great ears cocked and extended bat-like, the little bloodshot eyes flashing with fury, and the ear-rending scream of his 'trumpeting' form altogether a nerve-shaking spectacle; few who have experienced it at close quarters will greatly desire to have it repeated.

The popular notion that the elephant is a gentle, placid and inoffensive animal is by no means correct. When roused, they are savage and wary and pertinacious to a degree in following up anyone who incurs their wrath. This is particularly the case with the solitary old bull, the so-called 'rogue.' An elephant, which for some reason or other has elected to lead a solitary existence, establishes himself in a favourite haunt, and there may exercise for years a reign of terror; the undoubted intelligence of the animal

serves but to increase the danger. A 'rogue,' on finding itself pursued by trackers, will retire noiselessly into thick thorny cover, and, stepping to one side, will then retrace its steps and halt in some dense thicket close to its former path, ready to burst forth without the slightest warning on its unwary pursuers. These 'rogues' became a standing menace to a whole district, and the Government used to offer considerable sums as a reward for their destruction.

A notorious brute of this description infested the district where I was first employed. One morning his huge tracks were found deeply marked in the soil of the garden adjoining the verandah of the little wooden bungalow in which I slept. The elephant had passed in the night within not more than six or eight yards. Not long after, two estate coolies, a man and woman, were making a 'moonlight flitting' and were found in the morning by the roadside a mile away, the woman dead, the man with a broken thigh and otherwise terribly injured by this brute. A plucky Malay 'conductor,' inspired by the reward of a hundred rupees, was foolhardy enough to stalk the rogue single-handed. He was armed with an ancient weapon that looked more dangerous to the owner than to the quarry, but he was lucky enough to kill

him with the first discharge. Female elephants accompanied by their young are also to be treated with caution, as they will sometimes attack without the smallest provocation.

In old days, when these animals were in vast numbers, the damage they did to the crops and cultivation of the unarmed natives was enormous. Stages erected in the paddy-fields for watchmen, fires by night and similar devices availed but little, as the cunning beasts soon learned to disregard them. At that time rewards were paid for their destruction, whereas to-day a license has to be obtained before one can be shot. This state of things was naturally an encouragement to the sportsman, and the names of mighty hunters—'Sam Baker,' Major Rodgers, Palliser and others—are remembered for their deeds of prowess. Baker, afterwards known more widely as Sir Samuel Baker, the whilom leader of African exploration, has in his books on Ceylon left most interesting accounts of his experiences. Some notion of the number of elephants in his day may be gathered from the fact, vouched for by him, that in three days three men killed no less than 104 of these great beasts—a slaughter only to be excused by the damage inflicted by such hordes on the helpless villagers.

In my time the hunter took his life in his hand. The country was covered in great part by thickest jungle, and was often impenetrable to man save by the paths made by the elephants themselves. All hunting, therefore, was necessarily on foot; and there were no breech-loaders. Comparative safety was only to be found by stealthy approach to the closest of quarters, say to within twenty yards or less. Then you tried to kill your beast by a single well-directed shot from a heavily charged and powerful weapon in one of the fatal spots in the head which reached the brain. Big as is the elephant's head, the brain is relatively very small; and unless the bullet reached the brain it might as well have been fired into the nearest tree. The fatal spots are three; the frontal shot, that on the temple between the eye and ear, and the shot behind the ear, raking forward. Only one of these could be at any one time available, according to the position of the animal and the man; and in each case the spot to be reached, to be fatal, is no larger than a saucer. Then, too, the exact angle of fire had to be kept; if the animal stood higher, lower or on a level with the gun, the angle of fire varied accordingly. Add to all this the dense volume of smoke from the heavy charges of the black powder of that

period, and it will be readily seen that absolute coolness and nerve were called for. Much necessarily depended on the pluck and trustworthiness of the natives who carried the spare guns. It was our rule never to approach an elephant—above all, 'a rogue'—alone. Two sportsmen went together, taking turns for the shot; the second stood steadily, a little to one side to give assistance, should the first shot fail in immediate effect. Three double weapons each, two at least of these of heavy calibre, constituted an efficient battery; and it added immensely to the coolness of the hunters if these spare guns were carried by men in whom they could place implicit reliance. Such a man, for instance, was 'Nielgalla Banda,' of iron nerve and unfailing pluck, who is immortalised in Baker's books. He it was, by great good fortune, who took me up to my first elephant—a notorious old rogue who luckily fell dead at the first fire.

From time immemorial a lucrative traffic has been carried on in catching and taming elephants for the Indian market. One method of entrapping them on a large scale is that of the 'Kraal'—a Dutch variant of 'Corral,' in India known as a 'Keddah.' This is a great and lengthy undertaking, involving much expense and the

employment of hundreds of men for weeks on end. A suitable spot having been selected in dense forest in some secluded district, a stockaded enclosure of immense strength is formed of stout tree stems, bound with the tough creepers known as 'jungle ropes.' A long funnel-shaped entrance-way of similar structure and in V form leads out from the inlet gate to the jungle; all is kept as hidden and natural as possible, in the thick forest.

The native drivers start weeks in advance, gently heading and urging all herds that are within practicable distance towards the kraal, until at last they arrive close to the entrance. Then comes the great final effort on which success depends. At a given signal a simultaneous rush is made by the beaters, with shouting, gun-firing, and other discordant noises until, if all goes well, some at least of the herd have found their way into the funnel, and finally into the enclosure itself. Then the great gates are swung to and secured. The maddened brutes rush to and fro, screaming, roaring and trumpeting, and strive to break through the stockade. They are met by blank shots and spear points until, exhausted, they give in.

The noosers then enter, mounted on tame elephants. With great nimbleness they soon

manage to get the nooses of their tough raw-hide ropes round the legs of the captives. The ropes are then made fast to trees, and the poor beasts are helpless. In a wonderfully short time they accept the situation, and, escorted by the tame ones, are taken to the coast for shipment.

Another and more sporting method of elephant catching was carried on by the so-called Moormen, a brave and energetic Mohammedan race who are said to be of Arab descent. These men on foot used to capture elephants, without the help of tame ones. Provided with long elastic ropes of raw hide of great strength, they stalked the herd until they got close to their intended victim, preferably a half-grown animal. Sometimes they would succeed in getting a noose round a hind-leg before the beast was aware of their presence; failing this they surrounded and teased it into charging some of their number. Then the others seized the opportunity of rushing in and affixing the noose. The free end of the rope was then secured to a tree of not too large diameter, which yielded somewhat to the violent struggles of the elephant. So, one by one, every limb was secured, the trunk itself was bound, and the elephant rendered helpless.

THE STORY OF THE KEA.

THE STORY OF THE KEA.

PERHAPS the most extraordinary instance of an entire change in the ordinary habits of life of any creature, unique in suddenness as well as in degree, is that exemplified in the New Zealand mountain parrot, the kea.

This bird is a species apparently confined to the South Island of New Zealand, where it inhabits exclusively the bare and barren heights of the great mountain ranges. It is seldom seen below the so-called 'snow-line,' which is approximately an altitude of some 5000 to 6000 feet above sea-level. Here all 'bush' or timber growth ceases, and the heights are covered for half the year with snow.

This bird for long escaped observation. It is nowhere to be found in great numbers; it is somewhat local in distribution, and the regions it frequents are often inaccessible. As the pastoral industry of New Zealand developed, it occurred to a few of the more adventurous of

the pioneer sheep-farmers to drive some portion of their flocks to these higher regions above the bush-line in the summer months, when the winter snow had mostly disappeared. Thus, about the year 1856, the kea was first discovered. Some years passed, and little more was heard or thought of it; but presently that small band of pioneers found that some of their sheep at these high altitudes were being attacked, maimed and destroyed in a mysterious way by some unknown enemy. Dying and dead animals were found, and always in these high regions.

Various theories were set afloat as to the possible depredator; but these gradually crystallised into the belief—received with scepticism by many—that the kea was the culprit. The question was finally set at rest about the year 1868, when indisputable evidence was obtained from shepherds who had seen the kea in the act. It was thus established that a bird, little larger than a common pigeon, which up to that time could not possibly have fed on, or even seen, any mammal alive or dead, and certainly had never seen a sheep, had, in a short time, acquired a taste and developed a persistence and dexterity in satisfying it, that might almost be termed devilish.

Opinions naturally varied as to how this extraordinary change had first arisen. One theory was that the birds had come across the newly-flayed skins at the slaughtering-places, and had thus been introduced to raw flesh; another, that they had been innocently searching for ticks or other insects in the sheeps' wool, and had accidentally broken the skin, with the like result. I recently questioned Mr. Alexander F. G. Brown, one of the survivors of the enterprising pioneers of the higher ranges of the South Island. The following is the clear and vivid record of his experiences and recollections:

'As to the name, it is of course Maori and onomatopoeic, the cry of the bird varying from "Kee-ah" to "Kay-oh." I have heard Maoris use both of these sounds in naming it, but chiefly the former. To the question, Is it a ground parrot? I should say certainly not, though it might be called a rock or mountain parrot, as its habitat is in the rocky spurs and ridges of the mountains, at an altitude of from 5000 to 7000 feet above sea-level. Of course these heights are approximate, and I can only speak of Southern New Zealand where the snow-line is roughly estimated at about 5000 feet above sea-level. I have never known or

heard of these birds being seen much below the snow-line, and certainly never in the low country, and never in "bush," *i.e.* forest. The "snow-line" in New Zealand means the height at which all timber and shrubs cease growing on the mountains. The bush ends quite suddenly at the line; above that there is nothing but grass, moss, rocks and a few Alpine flowers, and possibly a few small berries. The snow lies down to the line for about six months, more or less, according to the severity of the season, but the rest of the year the mountains are clear of snow except in a few deep hollows. The average height of the mountains is some seven or eight thousand feet.

'As to the original food of the kea, it is difficult to speak with certainty. There were unfortunately no naturalists among the nine or ten squatters who had mountain runs in those days, and it was only on these runs that the kea could be observed. But when one is mustering sheep on mountains 8000 feet high, one has little time or inclination to attend to anything but the work in hand. Still we did discuss the matter, and the general conclusion was that the kea lived chiefly on grubs and insects, possibly on lizards if they existed so high up; the whole eked out with such seeds

and small berries (very few) as grew at those altitudes. In short, we considered that the kea was omnivorous, with the exception that it would not eat carrion; but our only reason for this last conclusion was that we had never seen it doing so—and for the former that there was nothing else for it to live on.

'How the kea acquired its regrettable habit of eating the backs of live sheep is, and I fear must always be, a matter of conjecture. The only thing certain is that the theory that the bird learned the practice through frequenting slaughter-yards is quite absurd, for the simple reason that there were no such places within two or three thousand feet of the elevation frequented by these parrots, and no one ever saw a kea in those days, when their horrid custom began, so low down. As I have already said, the number of mountain run-holders then was small; we all knew each other, and we and our shepherds were the only persons who had seen or observed the habits of the kea in any way, and the above theory was unheard of among us. To the best of my recollection, though of this I cannot now be positive, I believe his depredations were first heard of in the south. The shepherds had a theory that these birds began their evil practice through

alighting on the backs of sheep that had died in the snow. Sheep that perish in snow almost invariably die lying on their stomachs; when they die from other causes they fall on their sides; but as the sheep put to graze above the snow-line were invariably all young and strong, few if any deaths would occur among them except those caused by snow.

'It is easy to imagine that after alighting on the dead animal's back, the inquisitive parrot would commence turning over the wool as he is supposed to turn over the soil in his search for grubs. He finds a tick—probably dead—with its head buried in the skin of the sheep; in extracting the tick the kea breaks the skin, finds the taste good, or perhaps merely out of curiosity burrows deeper, and so begins his new habit. It is a mistake to suppose that the bird goes only for the kidney and the fat thereof. He eats all the meat from the loins and saddle first, and the first-comer, who I take it is the strongest and greediest bird, gets this; the last bird gets the kidneys and fat when he burrows so deep, which is not always the case by any means.[1]

'I once saw the first part of this operation

[1] This occurred on a spur at the south-west corner of the Takitimo Mountains.

very clearly and comparatively quite close, though unfortunately I was powerless to interfere till too late. I was bringing a large mob of sheep from the mountain down a very narrow ridge with precipitous sides when I noticed about 100 yards ahead a small flock or covey of keas, about six or seven (they are generally seen in lots of from five to twelve) in a state of great excitement, squalling and flying round and up and down just above the sheep. The sheep took no notice of them, and presently I saw that the parrots were confining their attentions to two particular animals. Two birds at a time would alight on the back of each sheep and grub away hard with their beaks, other birds would attack the first pair, and a conflict and scrimmage would ensue; then the pair of butchers would be left alone for a bit, and then the process was repeated. The strange thing is that the sheep did not appear to mind the attack or suffer much. They would give a little start forward now and then, or stop and shake, but otherwise they walked quietly along. I could do nothing to help them, as, from the nature of the ground, to have shouted, thrown a stone, or sent forward a dog would have probably sacrificed the lives of all, or certainly of many hundreds of the sheep, but as soon as

I got them on to safer ground I rounded them up and caught the two wounded animals. Poor beasts, they were in a dreadful state, their backs torn to pieces and the flesh eaten out, though not through to the kidneys. I had to kill the poor things, as their condition was hopeless.

'While I was thus engaged, the keas were squalling round me quite close, and I managed to kill one of them with my stick. They are very bold, fearless birds, and, like most of the New Zealand birds, intensely curious. Personally I believe that their curiosity is the real origin of their new habit, and that they commenced it by attacking newly-shorn sheep on which there was a scar or wound. Certainly I never saw a kea on a dead sheep, and as they are not supposed to touch carrion, I do not see how they could well learn to attack live sheep if they only practised on dead sheep that had not become high; their opportunities would be so few.

'In further support of my theory, I do not remember once noticing wounded sheep when we mustered for shearing about midsummer; though when we took the sheep down in autumn before the first snowfall there was always a number more or less mutilated. The beginning

of the habit, so far as South New Zealand is concerned, may be put down as somewhere about the middle of the "sixties." The kea was practically unknown and unheard of until some years after the mountain runs were not only taken up, but until the more venturesome owners took to summering their wethers above the snow-line. This would be about the beginning of the "sixties," but it was not until some years after that period that mysteriously-mangled sheep were noticed when the muster took place. What caused these wounds was naturally the subject of much discussion, and all sorts of speculations were brought forward to account for them.

'When I went out in '67 the question was still undecided, though the kea was by that time under strong suspicion; and in '68 or '69 the matter was finally settled by a shepherd on a run close to ours catching a kea *flagrante delicto*. He brought the bird home with him, and kept it in a cage for a long time, where it became very tame and seemed to live very happily, eating bread and mutton with equal relish.

'When one considers that the kea, until it adopted mutton as an article of diet, must have always suffered, more or less, from hunger, and

that it is not only of a very curious but also of a bold and fearless nature, one cannot be much surprised at its acquiring the new habit. Hunger and curiosity linked to energy are, I fancy, powerful stimulants to progress along the "path of evolution."'

During the forty or fifty years that have elapsed since the depredations of the kea were first noticed, and eventually brought home to the culprit, a good deal has been learned as to the life-history of the bird. Owing to the remoteness of the regions inhabited by it, and doubtless also to the fact that those brought into immediate contact with it and its progress in evil ways were busy men, such knowledge was of very gradual growth, and came only by slow degrees to the cognisance of the public generally. Such records as were from time to time printed appeared, for the most part, in local publications, chiefly in the *Transactions of the New Zealand Institute.*

Since writing this paper, I have read with interest a recent work, entitled *The Kea: a New Zealand Problem*, by G. R. Marriner, the Curator of the Public Museum, Wanganui, New Zealand. In this little work the principal facts, theories and conclusions have been brought together. It is interesting to find that the views

and experiences of the early pioneers, given in the letter from one of them printed above, are here corroborated in almost every detail.

The nesting of the bird was unknown when it was first discovered, and so remained for many years. It is, indeed, only quite recently that its nest and breeding habits, which so long evaded research, have become known. The nest is placed far within deep recesses and crevices of cliffs and rocks that are always remote and often inaccessible; in 1882 the eggs were still unknown, and even to-day are so scarce as to be worth £1 an egg. They are white, and usually four in number.

Mr. Marriner states that the nesting season is from June to September; but as he also gives an instance of a nest being found with eggs in January, the breeding period would seem to be very irregular. A singular peculiarity is noticed in the exceptionally long period during which the young remain in the nest, an instance being given in which the young, found in September, were still in the nest in December; in fact, it is said, *loc. cit.*, that they remain there until quite full-grown.

The vexed question as to what was the cause of the Kea first commencing his terrible butcher-habit is fully discussed by Mr. Marriner;

but it is left, as before, a matter of doubt and conjecture. We shall probably be right in thinking that it had not necessarily, or even probably, one single origin. It is difficult to imagine that such a custom commenced with one individual bird; and different causes may very likely have started the habit at different times. It is on record that in some cases years elapsed after flocks had been driven to new 'Kea country,' before the first cases of mutilation occurred. It must be mentioned, however, in favour of the 'Tick' theory, that a singularly analogous case is mentioned by Mr. Marriner as occurring in British East Africa. Here, according to Professor Ray Lankester, the Rhinoceros-bird formerly fed on ticks that infest game and domestic animals; and when the animal had a sore, would probe it to such an extent as sometimes to cause death. The great herds having been destroyed by the cattle plague, and this source of food thus no longer available, 'the birds have become carnivorous, and now any domestic animal, not constantly watched, is killed by them. Perfectly healthy animals have their ears eaten down to the bone, holes torn in their backs and in the femoral region.'[1]

[1] *Nature*, August, 1900.

As may be readily imagined, the kea has for long had a price set on his head, and kea hunting was taken up as a profession that, for a time, yielded a fair profit. It is not likely, however, that the species will be exterminated for many a day, if ever. Vast tracts of wild and inaccessible country will probably for long afford a sanctuary to a remnant.

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